Amateur Communications

April 1993 • $2.50

The Ham Operator's Magazine

Troubleshooting Feedlines
By Ralph Tyrrell, W1TF

Getting Along With Other Radio Services
By Frederick O. Maia, W5YI

A Simple Multiband Vertical
By Richard Morrow, K5CNF

Dx-ing From A Bicycle Mobile
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Sunspots, Their Origin And Effects
By James G. Lee, W6VAT

S.O.S. CW
By Ted Hermann, AE8G

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FCC Acts On ARRL Petition
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Nominations are requested for Amateur of the Year, Special Achievement and Technical Excellence awards. Refer to the Hamvention Program for nomination form or contact Hamvention Awards Chairman, Box 964, Dayton, OH 45401-0964.

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Amateur Communications

The Ham Operator's Magazine

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COVER: Carlos Poirot, KC4SJL, Transmitting from his "Mobile Station".
Photo: Christian Poirot.

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The opinions expressed by the independent contributors of *Amateur Communications Magazine* do not necessarily reflect those of the staff, management or owners.

We welcome contrasting points of view.

Contributions are welcomed and should be submitted in a 3½ or 5¼ disk in ASCII file along with a double-spaced hard copy to: ***Amateur Communications Magazine*, 8250 NW 27 St., Suite 301, Miami, FL 33122.**

Dx-ing From A Bicycle Mobile

By Carlos Poirot, KC4SJL

It all began when hurricane Andrew struck South Florida, destroying my residence and belongings. Forcing me to move to a new neighborhood. Trying to free myself from tension, and hoping to make the most of my free time, I began to ride my bike through the neighborhood, in order to get to know the area. I was accompanied by my new Kenwood radio TS-430.

In this way I initiated my new activity as mobile 'Dx-cyclist' operating DX in HF with a Kenwood multiband, a battery, and a Hustler RMX-10 antenna for 10 meters.

The adjustment of the antenna was made keeping in mind my position on the bicycle. The ROE was of approximately 1:1.8. As for the antenna itself nothing was modified. It was installed in the rear part of the bicycle with a mount for a mirror.

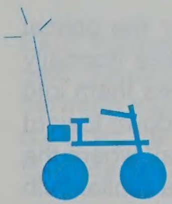
The Kenwood TS-430 was kept going with a vehicle battery, also mounted in the rear part of the bicycle, and was held with pieces of elastic. The radio was installed towards the front in a special basket for bicycles, held by a strap.

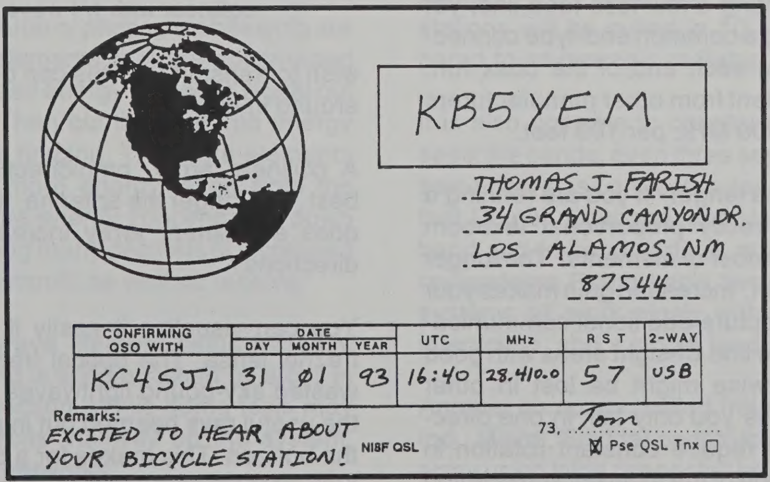
In reference to interferences, electrical cables of high tension produce plenty of noise, however, the bicycle itself does not produce any noise problems. As for interferences caused by motor vehicles and metal bars, fortunately, since my activity was limited to my neighborhood, I had no mishaps. The only problem resulting was stationing the bicycle since the equipment was very heavy. The intensity of the reception signals were somewhat affected with the closeness of the trees, big structures, trucks, etc., which produce a notable extenuation of the signal, for both the transmission and the reception. In part this is due to the change of the radiation patron. Another factor very influential, is the movement of the station, which produces QSB effects (fading signals).

The contacts made were Tom, KB5YEM, Alamos, New Mexico, whose valuable QSL confirms, and HK4OTF of Columbia.

On this occasion I did not experiment with headphones, although most probably you may use VOX with headphones and the PTT which will activate when once spoken. This can be useful in zones of much traffic were you have to maintain your hands settled, however, this is not recommendable. The activity can also be carried out with a multiband antenna.

In conclusion what I would like to say is that you may operate DX in HF, on bicycle, very easily, without complications, and different equipment. I enjoy this very much. Obviously you must be cautious in choosing your route in a way that you do not run into traffic problems. Probably my next experiment will be on skates. The radio carried in a knapsack and a helmet on my head with the antenna. The only problem would be that I would not be able to change bands. ■





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NI8F QSL

73, Tom

☒ Pse QSL Tnx ☐

Tom's QSL, KB5YEM, of Alamos Mexico, confirming the communication.

Pump Up Your Two-Way Power With A Collinear

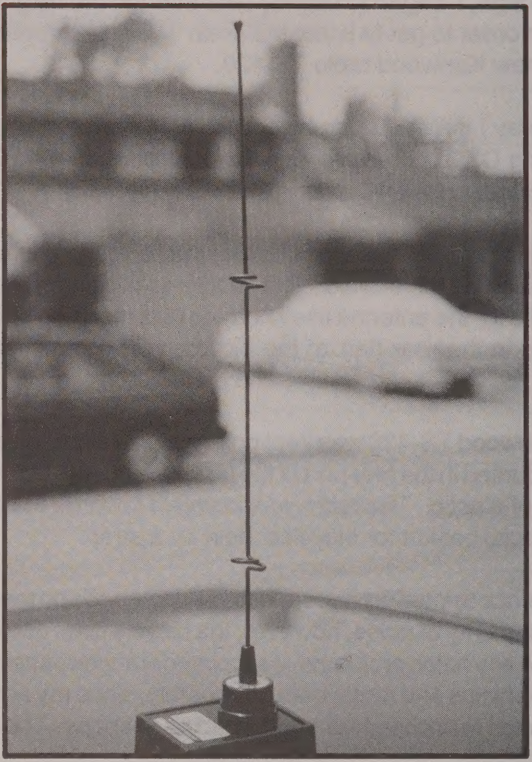
By Gordon West, WB6NOA

Do you need a little more signal to access that distant repeater? Or to kick up your VHF or UHF base station reception? An expensive power amplifier to boost your output would need to be at least a 4 times increase over your present power to make a significant range advancement. The power amplifier only boost's outgoing power, and won't help you at all in picking up a station that your antenna system just can't hear. Do not be misled about the benefits of a power amplifier's receive preamplifier—the little pre-amps in a power amplifier may have little merit to a wideband FM set that may already have an overly sensitive front-end receive circuit.

The key factor in boosting both your outgoing effective radiated power, and incoming signal strength, is with antenna height, antenna length, and low loss coaxial cable feed line.

Get your VHF or UHF antenna system up as high as possible, and make sure that it is fed with semi-rigid coax specifically designed for ultra high frequency work. Commercial hard line is best, but connectors are relatively expensive. These semi-rigid coax, the exact diameter of standard RG8 (RG213) coax, are designed specifically for amateur operators wanting a low loss feed line, yet with the capability of adding a common end-type connector of PL-259 connector at each end of the coax run. Belden #9913 or its equivalent from other manufacturers may only be 2 dB loss at 400 MHz per 100 feet.

Now let's talk about antenna length. If you are running a beam antenna, gain is directly proportional to boom length. Forget about the number of elements. The longer the boom, the higher the gain. Increased gain makes your VHF or UHF transceiver capture additional communications range by filling in those line-of-sight areas with good signal strength that otherwise might be lost in other unwanted directions. Unless you only talk in one direction, a beam antenna will require constant rotation in order to point it in the direction of the different stations you wish to transmit to. This can be a nuisance if you talk all around in circles.



Larsen stacked 5/8 wave over 5/8 wave collinear with 1/4 wave bottom section.

A collinear array, omnidirectional, vertical antenna is best. The longer the antenna, the better it works. But how does a collinear array increase signal strength in all directions?

You can visualize it easily if you consider the optical freznel lense. The optical freznel lense takes normally wasted sky-bound lightwaves, and combines them into the useful rays beamed out in all directions down toward the horizon. This makes for a brighter "signal" where the bulb intensity is magnified many times over a similar bulb

The new series of Hustler collinear big base antennas require large mast mounts.

that radiates up, as well as radiates out.

A simple ground plane for VHF or UHF work is like a tiny lightbulb—you send as much signal straight up as you do out to the horizon. This is known as an isotropic radiator.

Inside the white fiberglass tube or phased mobile whip are multiple tuned halfwave elements that are constructed end to end. Fed with in-phase energy that pulls signal out of the straight-up plane. Then combines it into energy going out down low to the horizon. The more elements stacked end to end, the more energy taken from the higher planes, and the more energy concentrated down to the horizon planes. Adding many decibels of increased signal strength on both transmit, as well as receive.

Each halfwave or 5/8th wave element helps increase gain. Equal current phasing is accomplished by a coil in between each halfwave section. While some folks may consider these "loading coils" halfway up the system, they are actually phasing networks.

Just like the Yagi, any attempt to make the system shorter will decrease results. The taller the collinear, and the more elements within the collinear system, the greater the gain. A 10 dB gain VHF or UHF collinear could amplify your power output to an effective radiated power 10 times stronger than what you originally started with. Weak stations will be pulled in 10 times stronger when compared to an isotropic radiator.

It is also possible to construct a collinear array for two separate bands, even three separate bands, all inside the same fiberglass protective radome. This is the technique that Comet, Diamond, and Valor have inside their dual-band and tri-band vertical, omnidirectional, collinear array systems. Remarkably, two or three, separate antenna systems all work nicely within a single tube with little interaction, and a single feed line for the entire works.

Another company, called Ireland Antennas (Universion, Inc., Miami, Florida) constructs its single-band, collinear array using wide copper foil imbedded in the fiberglass as the actual elements. This increases band width, decreases conductor losses, and makes for an extremely lightweight, single-band, high-gain collinear array. They have 20 foot VHFs and 20 foot UHFs, 2-section, base station antennas that are extraordinarily lightweight, but really hack a power punch on both transmit, as well as receive. Call them on their toll free number (800/289-8366) or fax (305/477-5944) for information sheets on their fiberglass, lightweight, imbedded-foil, collinear arrays.

For repeater and commercial rooftop installations, most amateur radio fiberglass, single-band, collinear arrays may not be rigid enough nor vibration-proof on the inside to handle the rigors of mountain-top or building-top installations. The ham radio style single-, dual-, and tri-band collinears are fine for the home, but nowhere in construction to match "real" repeater and base station commercial antenna systems.

Repeater operators wanting a heavy-duty, commercial-quality, base station antenna, would probably select from the following manufacturers:

Antenna Specialists
Celwave
Decibel Products
Telewave
Maxrad
Hustler Newtronics

Each of these companies produce a single-band, VHF or UHF, vertical collinear array with major sized copper elements on the inside, encased by a tough fiberglass radome. Each of these antennas also have a sturdy minimum 18-inch aluminum or steel mast, equipped for the common galvanized steel mounting clamps. Mounting clamps permit mounting the antenna to a support pipe up to 3-1/4 inches O.D. Most of these major-sized antennas also feature lightning protection.

Hustler, a well-known name in amateur radio, high-frequency, mobile antennas, has just inaugurated a new

(Continued on page 56)

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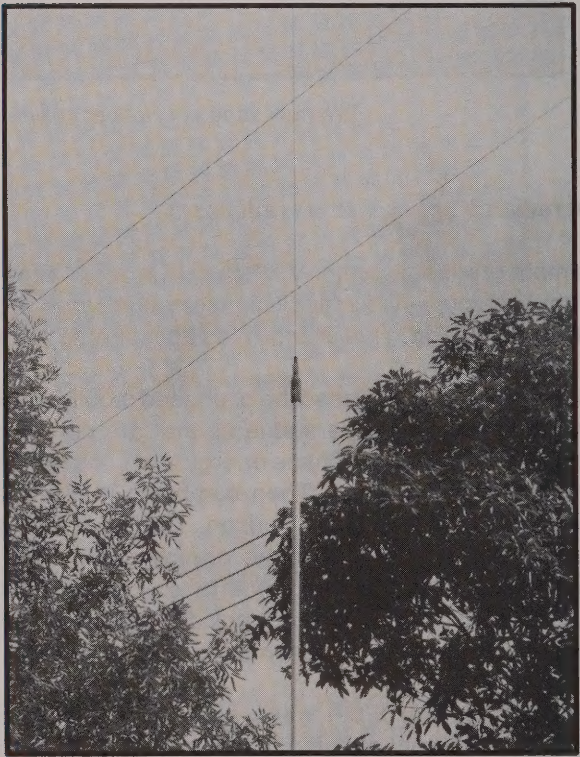

***Warning:** Watch out for power lines.*
You could be killed!

A Simple Multiband Vertical

By Richard Morrow, K5CNF

Vertical antennas are alternately cursed and phrased depending on how much luck a person has had with them. The military uses a lot of vertical antennas on ships and on vehicles for the 2-30 MHz range. On board ship, the antennas are about 36 ft. long and when the Army or Marine vehicles are stationary, the whip can be extended to 36 ft, if need be, in case the unit is going to be stationary for a while, and sets up a firebase or other similar installation. With an automatic antenna tuner/matcher the whip can be used with varying degrees of efficiency to cover the range of 2-30 MHz range.

So how does that tie in with the Ham bands? Simple, the same whip can be used on the Ham hands with a base-mounted tuner. The big catch is that the antenna tuner has to be at the base of the antenna, not at the rig. I was told by a Ham that it doesn't matter where the antenna tuner is as long as the antenna SWR is 1.5:l. Well, that's incorrect. The location of the tuner *is* important! I have seen many conditions where the coax would load up and radiate better than the antenna. You'll get a lot of RF in the shack, which you do not need. In Fig. 1 you'll see the basic 1/4 antenna such as used on 40 meters. It's not drawn to scale, but could be for any band.

40 Meters

Lets begin with a 40 meter vertical, 31.65 ft. tall and go on from there. Figure 2 is the elevation pattern for a simple

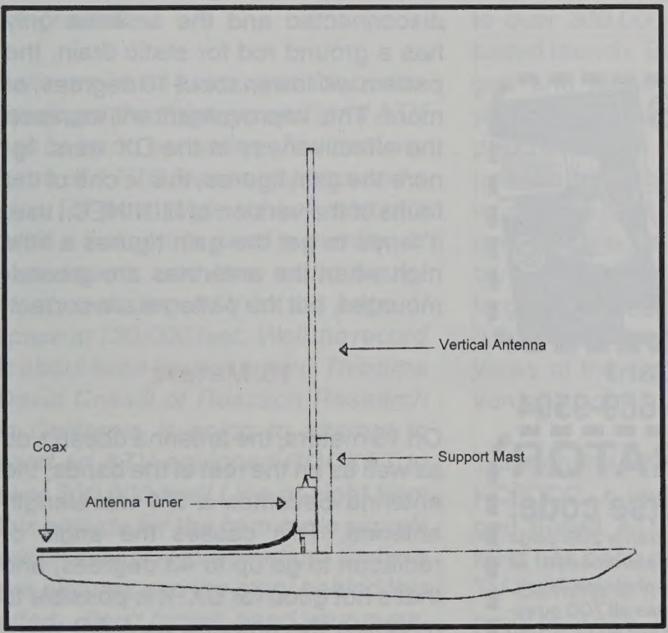

Figure 1
Basic 1/4 Wave Vertical

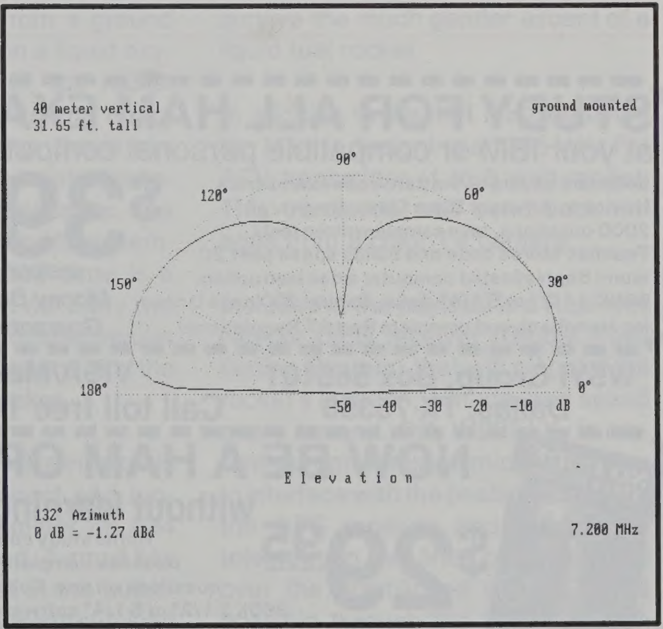

Figure 2

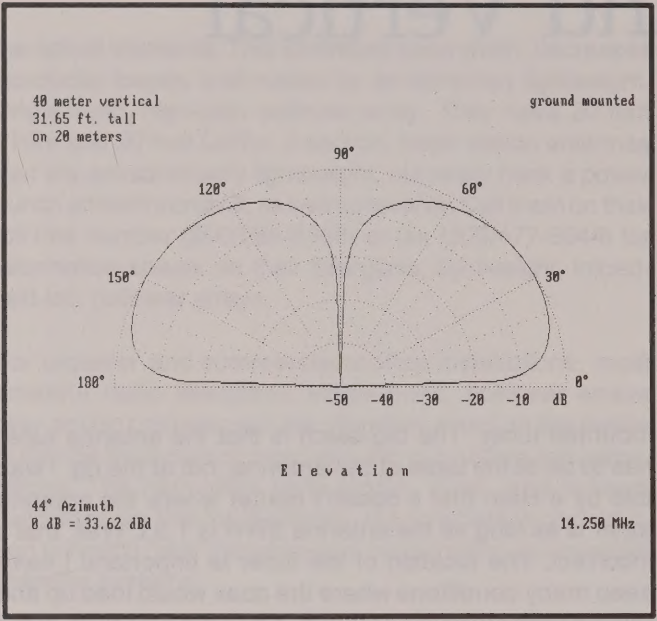

Figure 3

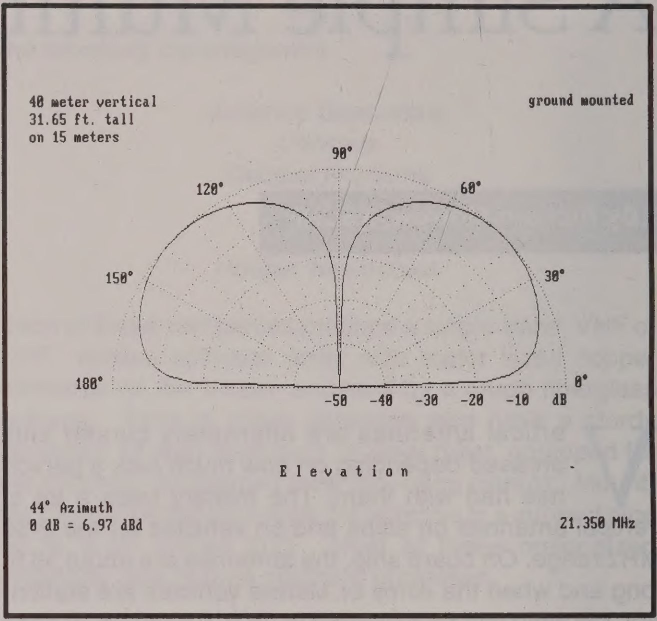

Figure 4

1/4 vertical, the radials are placed along the surface of the ground. The elevation pattern shows that there is an angle of radiation its maximum between 25 and 20 degrees, which is good enough for DX work on 40 meters. All that has to be done is to match the antenna with the matching circuit in the tuner and start looking for DX.

20 Meters

Figure 3 shows the elevation pattern for the same antenna on 20 meters, with the angle of radiation increasing to 42 degrees. It will work fine on DX and the only thing you need to do, is to tune your antenna to 20 meters with the antenna tuner. If the radials are disconnected and the antenna only has a ground rod for static drain, the pattern will lower about 10 degrees, or more. This improvement will increase the effectiveness in the DX wars. Ignore the gain figures, this is one of the faults of the version of MININEC I use, it tends to get the gain figures a little high when the antennas are ground-mounted, but the patterns are correct.

15 Meters

On 15 meters, the antenna doesn't do as well as on the rest of the bands, the antenna becomes a 3/4 wavelength antenna. This causes the angle of radiation to go up to 43 degrees, and that's not good for DX. It is possible to resonate the antenna as a 5/8 wave antenna with a little work with the antenna tuner, and that would give you a much lower angle of radiation. High

(Continued on page 52)

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Getting on top of ATV!

By Henry Ruh, KB9FO

How tall is your tower? No matter how tall it is, you want to have a bigger one. I know, mine used to be 160 feet high and I wanted 300 feet, so one day I put up my own 330 foot tower! Still, operating from my plane at 7,000 or 10,000 feet was always more exciting. In VHF and up, the range you get is typically limited by how high your antenna is. Living in Marina City, a 60 story condo in Chicago, I enjoyed having an 8 foot coax to an antenna 500 feet above the ground! Astute readers of Amateur Communications will remember the last issue where this column told you about unmanned aerial vehicles to get your signal off the ground.

Balloons have been used for centuries to get the "high ground" and ATV has been no exception. The January issue of ATVQ features photos and a story of how high school students used a balloon to send a number of experiments and ham radio equipment, including ATV to the edge of space at 130,000 feet. Well the record is about to be broken again! This time David Crisalli of Reaction Research in California is going to attempt to send an ATV equipped ROCKET to over 300,000 feet! Line-of-sight from this altitude for the ham radio signals will be over 600 miles radius! So here are pictures and the story behind this effort. Don't forget, send your questions and comments about ATV to: Henry Ruh KB9FO, 1545 Lee St., Des Plaines, IL 60018.

Liquid Fueled Rocket to Carry ATV to 300,000 feet!

By Bill Brown WB8ELK

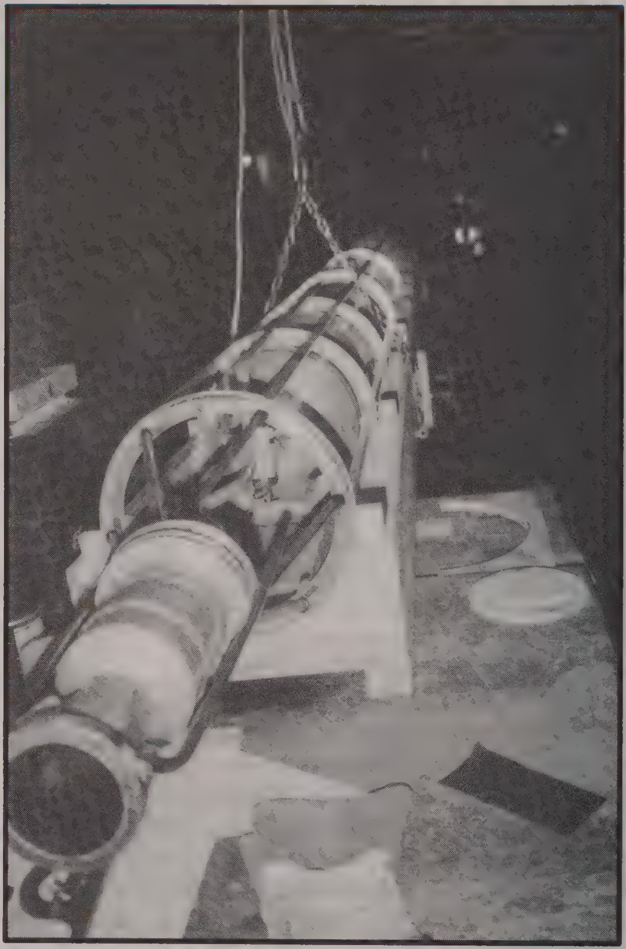
David Crisalli of the Reaction Research Society in southern California is currently building a unique rocket capable of taking a 10 pound payload to over 300,000 feet from a ground based launch. Based on a liquid oxygen and kerosene fuel, the rocket weighs in at 320 pounds and is approximately 19 feet long. David has been busy machining the metal framework, pressure, and fuel tanks. As well as, the nose cone and fin assembly. Just below the nose cone is a large payload area that will carry two ATV transmitters aloft for spectacular views of the Earth as seen from the vantage point of the rocket.

Through the efforts of Mike Henkoski KC6CCC, a very compact and rugged 6-watt ATV transmitter on 434 MHz has been designed. A small b/w TV camera is mounted in the bulletproof package. This package survived an earlier solid fuel rocket flight to 1100 feet that crashed into the desert floor. Nothing remained of the rocket except the tail fin. Mike's ATV payload was pulled out of the rubble and was completely intact and functional! After this kind of abuse, it should survive the much gentler ascent of a liquid fuel rocket.

In addition to the 434 MHz transmitter, Mike is designing a 1265 MHz FM ATV transmitter (1 to 8 watt range). This transmitter will send back images from a color TV camera.

Included in the payload is a Rockwell Navcor GPS receiver (Global Positioning System) that will pinpoint the rocket's location, altitude, and speed every second. Bill, WB8ELK, is currently programming a micro controller to interface with the position data from the GPS receiver and overlay the telemetry in two lines of text directly over the downlinked video. This is possible through the use of a High Technology Flight VO-2 video overlay board (supplied by Bob Rau N8IYD).

Liquid fuel rocket designer David Crisalli with the tail fin assembly. The ATV antennas are mounted on the trailing ends of the fins.



The business end of the rocket under construction. The rocket will be 19 feet high when fully assembled.

Ben Frink, KD4BFG, and David Couvillon, KC4WDW, of Southeastern Community College in Whiteville, NC are supplying a VHF/Touch Tone receive system to allow for remote control of the parachute deployment in case of failure of the timer mechanism.

The antennas will be vertically polarized and are mounted on the tail fins of the rocket.

Tentative plans are for a May 1993 launch from the White Sands Missile test range at White Sands, New Mexico. An alternative site may be available just north of Reno, Nevada as well.

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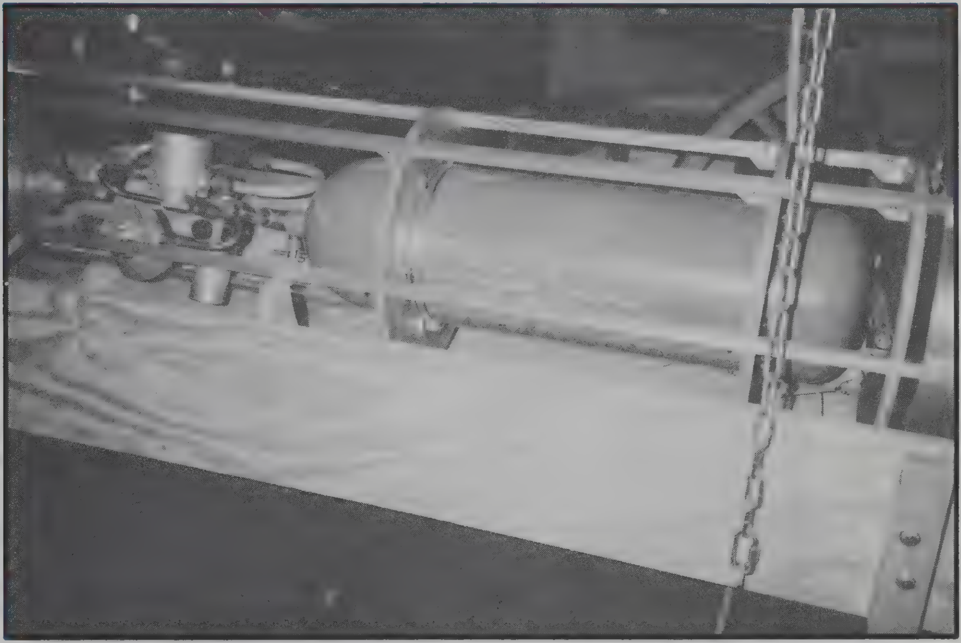

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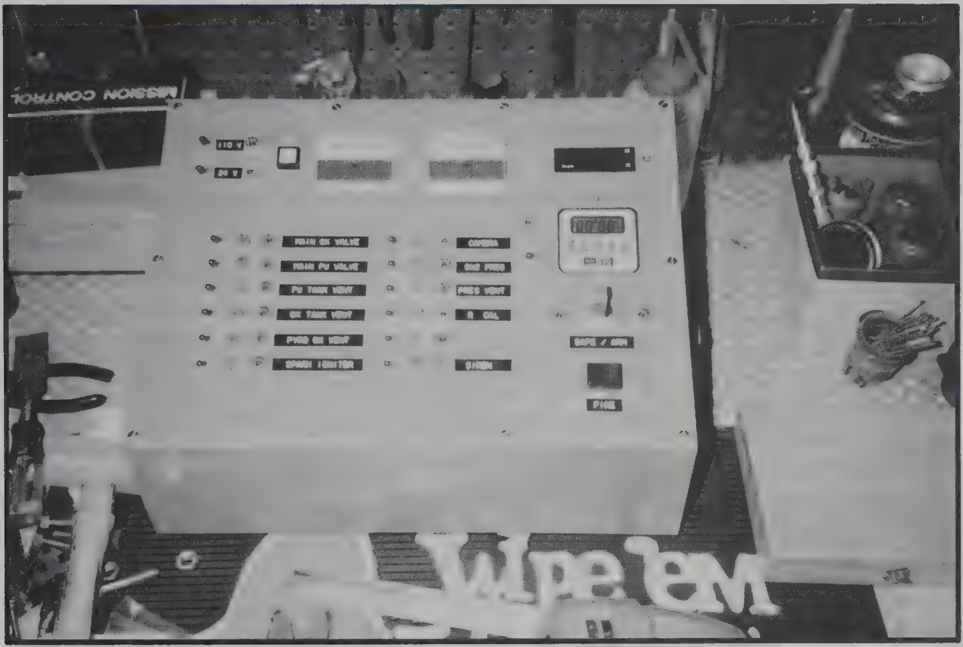

The launch control panel allows David to safely start the launch sequence.

feet, anyone within 700 miles of White Sands should see the video signal. The signal should be viewable over all of New Mexico, Arizona, Colorado, Utah, Kansas (including Kansas City), Texas (including Houston), Oklahoma, most of Nevada, southern Wyoming, parts of Nebraska and southern California.

It should take about 2 minutes to achieve the peak altitude and the descent will take about 20-30 minutes (if the parachute works).

An HF net will operate with launch updates during the event on 7.155 MHz (7.227 MHz is a possible alternate frequency).

Watch for packet BBS bulletins about this flight as the launch date draws near. Also announcements will be made on the HF ATV nets on 3.871 MHz (Tues. evening at 9 P.M. EDT - Midwest) and the West Coast net every Sunday morning at 10 A.M. on 7.243 MHz. The AMSAT nets and bulletins should have details as well. ■

SAREX Aboard STS-50

By Tina Jones, WA8U

In July, 1992, select amateur radio stations across the United States experimented with transmission of Fast Scan Amateur Television (FSATV) into space as part of the Shuttle Amateur Radio Experiment (SAREX) on NASA Space Shuttle Mission STS-50. Student and adults alike were thrilled by the chance not only to talk to the astronauts but also to send television to the Shuttle as it orbited our planet. STS-50 was only the second manned space mission that was equipped to receive FSATV. The first was STS-37 in April of 1991, which also carried the SAREX package.

The record-breaking fourteen day mission studied the effects of weightlessness in the first United States Microgravity Laboratory. It was the first in a series of Space Shuttle Space Lab missions dedicated to performing United States research in a low gravity environment. Of the seven astronauts on board, two were ham radio operators, mission commander Dick Richards, KB5SIW, and mission specialist Ellen Baker, KB5SIX

Six amateur radio stations in the continental United States were selected to participate in the television experiment. Each station had two scheduled attempts to send television signals to the Shuttle during the mission. Unscheduled TV transmission opportunities occurred at other times during the mission. The ground stations were a mixture of NASA center club and private stations. The stations were KC6A, Jim Steffen, of Long Beach, California; W5RRR, the NASA Johnson Space Center Amateur Radio Club, located near Houston, Texas; N9AB, Andy Bachler, located in Mundelein, Illinois, near Chicago; WA4NZD, the NASA Marshall space Flight Center Amateur Radio Club, in Huntsville, Alabama; WA3NAN the NASA Goddard Space Flight Center Amateur Radio Club, in Greenbelt, Maryland; and KE4PT, Kai Siwiak, located in Pompano Beach, Florida.

Andy Bachler, N9AB, in Mundelein, Illinois, designed the amateur television package used for SAREX. The flight hardware package used during STS-37 was modified for improved performance without adding to its size, thanks to contributions made by Fred Reimers N9ATW, of FAR Circuits, and Al Lowenstein, K7ATM, of Motorola Cellular Products Division. The dual band antenna was modified to operate in a window different than the one for which it was originally designed with the help of Jerry Coles, KB5ARA. Coles also developed an in-flight maintenance procedure which enhanced the 2 meter signal quality when problems arose early in the mission. In the words of SAREX team member Kai Siwiak, KE4PT, “Three cheers to Jerry for doing a hero’s job on a tricky antenna redesign problem!”

Transmission material from Bachler’s station consisted of a video tape of the antenna and shack, a tape of students who had built “space habitats” and participated in space simulations earlier in the year, and live video with superimposed station identification to introduce the tapes. Even though the maximum elevation of the Shuttle, above the horizon, when viewed from Bachler’s station was only four degrees, Commander Richards reported that these signals were visible aboard the orbiter. Reviewing the tape of received signals showed that Commander Richards was treated to a brief, but clear view of the very impressive antenna array (16-bay, 21-element Quagi) Andy used to send him the video.

The Johnson Space Center Amateur Radio Club coordinates all SAREX activities. John Nickel, WD5EEV, Club President for 1992, and Lou McFadin, W5DID, are the CoPrincipal Investigators for SAREX. Members of the Johnson Club and AMSAT operate positions in the Customer Support Room at Mission Control around the clock during these missions. Brad Smith, KA5CDJ, and Jerry

KC6A #1- Lakeside Jr. High School after the successful contact. The news media swoops in to interview the four students in the foreground, who are, from left to right, Kelly Lasswell, Richard Andrade, Gloria Moya, and Christine Ramos (back to camera). In the extreme upper left of the picture is Doug Gilbert, WA6LXB.

Coles, KB5ARA led Johnson's FSATV portion of STS-50 SAREX. Gill Carmen, WA5NOM, provided orbital element updates to the world during the mission. Following the flight, analysis of the video tape of received signals confirmed that several of W5RRR's transmissions were successfully received on board the orbiter.

The Goddard Space Flight Center Amateur Radio Club provided the High Frequency retransmissions of the Shuttle air-to-ground transmissions as they have previously. They also coordinated all telebridge activities linking participating schools to amateur ground stations in Hawaii and Corpus Christi, Texas. Ron Parise, WA4SIR, an STS-35 crew member, coordinated Goddard's activities.

On the first of two scheduled passes, the Goddard amateur television team, led by Chuck Sommer, N4OSD, and Bob Burninga, WB4APR, transmitted a videotaped greeting to crew member Ellen Baker, KB5SIX, from her mother. On their second pass, they uplinked a weather report for landing day done by none other than Willard Scott. A brief segment from the first uplink attempt, with the WA3NAN call sign superimposed on the images, was captured on the on board videotape, after Richards and Baker returned to earth.

Jim Steffen, KC6A, of Long Beach, California, previously made history during STS-37 by becoming the first to transmit FSATV video to a manned orbiting spacecraft. Building on this success, he used the first of his two scheduled passes to carry out a contact between the Shuttle crew and local middle school students. His team selected ten schools within ten miles of his home shack from a list provided by Rosalie White, WA1STO, manager of the ARRL Educational activities Department. They chose Lakeside Junior High, and asked Wanda Shaffer, N6LXW, a science teacher there, to come up with a project that could be demonstrated by her students in two minutes. They decided to demonstrate Newton's Third Law ("For every action there is an equal and opposite reaction") using some coins and a Newton's cradle. The tape of the experiment was transmitted to, and for the most part, received on board the shuttle. ATV transmissions were relayed directly from the school to Jim's shack via a 1.2 GHz link, while the students spoke directly to Commander Richards over a 2 meter link directly from the school. Nearly the entire contact was visible on the video

KC6A#5- Antenna array at KC6A. On the left is a small tower with the 1.2 GHz and 6 meter antennas used for the ATV and audio links between KC6A and Lakeside Jr. High. On the lower boom on the main tower to the right is a 22 element circular polarized antenna for two meters and a 4 by 30 element circular polarized antenna array for 430 MHz for the video uplink to the orbiter.

tape of received signals as they asked Commander Richards how the steel balls would react in microgravity, and how much force it would take to move the first ball. Portions of the ATV audio were audible on the videotape, while the entire contact over the two meter frequency was perfectly clear in both directions.

It was a very successful contact for the students. They learned first-hand from an astronaut traveling in space that where he was, only a very special Newton's cradle would keep the balls in line, since in space things tend to fly apart. When the contact was over, the audience stood and cheered! The contact appeared at least five times on the news that night, and in at least three newspapers, including the Los Angeles Times.

In addition to Wanda Shaffer and Dave Gutierrez, many others contributed to the success of the contact, including Doug Gilbert, WA6LXB; Wayne Overbeck, N6NB; Jim Porep, KC6TFV Tom O'Hara, W6ORG; Sheila Bird N6LX; Dave Bird, AA6DB; John Levin, KM6JV; and Doug Rice, KK6OU.

With the help of Roy Neal K6DUE, Jim also obtained a video tape of a short monologue prepared specially by Jay Leno for the crew. Leno had agreed to prepare the routine upon learning that Commander Richards is a big fan of his. Nearly all of the video and portions of the ATV audio sent by Jim were succesfully received. The audio was also transmitted over the two-meter coordination frequency as a backup.

Kai Siwiak, KE4PT, of Coral Springs Florida, and Andrew Rusnock, WB4BKC, assembled a "field day-like" station in Pompano Beach, Florida. The KE4PT operation used WB4BKC's moonbounce antennas, which, unfortunately, was later destroyed by a tornado. Commander Richards, said that theirs were the loudest signals heard on 2 meters! They also had voice contact with Mission specialist Baker on one orbit. Their transmissions consisted of mostly taped material in addition to participating in transmitting the Jay Leno tape. An image of the SAREX shield logo was clearly visible on the tape of received ATV signals.

Terry Jones, NZ8C, of the Marshall Space Flight Center Amateur Radio Club (MARC) coordinated the FSATV portion of the mission. Because two or three ground stations shared each of five dedicated passes over the U.S., it was necessary to make sure that only one station transmitted at a time. Jones established transmission schedules and updated them throughout the mission to keep up with changes in the Shuttle's orbit. During a pass, Jones and other MARC members coordinated the transmissions of the ground stations from the club's shack at the Marshall Space Flight Center.

The Marshall Club also used one of their two passes to provide area students an opportunity to talk to and, hopefully, be seen by Commander Richards. Three students each from two area schools and the Huntsville, Alabama Boys' and Girls' Club came to the club shack for the contact. Each group had one question for Commander Richards. The question and answer session with the young people went very well on the two meter voice coordination frequency. Unfortunately, none of the FSATV transmissions from WA4NZD could be positively identified on the tape of the received signals.

Other MARC members involved were Don Hediger, N4MSN; Tina Jones,WA8U; Larry Savage, WA4CAX; Brian Kirby KD4FMN; and Gene Marcus, W3PM.

Although the FSATV team had high expectations of the STS-50 mission, reports from the crew during the mission and post-flight debriefings were cause for concern. During the flight, problems with the SAREX antenna forced all two meter operations, including random QSOs, onto the frequency set aside for FSATV coordination. Correcting the antenna problems saved most of the 2-meter operations, but appeared to adversely affect the FSATV reception. Additionally, due to the nature of the experiments in the Microgravity Laboratory, the shuttle flew with its tail down and payload bay forward. This antenna was located in one of the overhead windows. These two factors meant that the body of the orbiter blocked the signals from the ground once it had made its closest approach to the ground station. This cut the useful part of a pass down to only the first half, from the time when the orbiter first appeared above the horizon to the highest in the ground station's sky.

However, analysis of the video tape of the received signals on board the orbiter showed much more video was received than originally thought. Some of this video was accompanied by clearly understandable audio and full color. According to Bachler, "The Houston SAREX team made gallant attempts to raise our spirits by acknowledging the work and contributions that the FSATV team made, the outstanding success of the transmissions was not realized until later when the STS-50 FSATV tape was reviewed back on earth."

The FSATV team is now preparing for the next shuttle flight that will carry the SAREX FSATV package. This is planned for STS-56, currently scheduled for launch in late March, 1993. A two element beam to improve reception is presently undergoing flight certification, and all stations are preparing their stations and transmission materials using information gathered and lessons learned from the previous two SAREX ATV flights. With the 57-degree inclination orbit of STS-56 and variable spacecraft attitudes providing the best pass opportunities yet for a SAREX ATV flight, the team is optimistic that high quality signals will be consistently received on board proving ATV's place in manned space amateur radio communications.

*KE4PT #3- Shows a view of the antenna array used by KE4PT for STS-50 ATV SAREX. The ATV antennas is a 38-element 432-13WL M**2 Yagi which yielding an effective radiated power of 12 Kw, including feedline losses. Two meter voice coordination was accomplished with the homebrew 4-bay moonbounce array with an estimated effective radiated power of 150 Kw.*

For STS-50, it was as it is with so many ham activities. After all the preparation, sometimes frustrating, hard work beforehand, and the tense moments just prior to establishing contact, everyone felt rewarded just by the sound of their call signs returning from fellow hams travelling in space. ■

ARRL Foundation Announces Scholarships for 1993-94 Season

The ARRL Foundation Inc., located at the Newington, CT headquarters of the American Radio Relay League, Inc. will administer sixteen scholarships in the 1993-94 academic year. Several scholarships feature multiple awards, allowing for a minimum of 22+ actual awards granted. Award amounts are $500 to $5000 with ten awards at $1000 or above.

The ARRL Foundation Scholarship Program is open to all licensed Radio Amateurs pursuing a course of accredited study beyond the high school level. Some of the scholarships ask for ARRL Membership or, state geographic or, academic preferences. Complete information, and an application form can be obtained by writing prior to February 1, 1994 to: The ARRL Foundation Scholarship Program, 225 Main Street, Newington, CT 06111. Or by calling (203)666-1541 Ext. 203, M-F, 8-4 EST.

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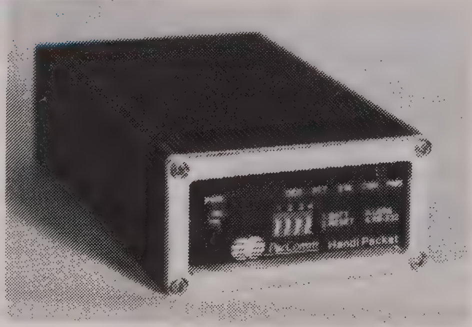

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Troubleshooting Feedlines

By Ralph "Ty" Tyrrell, W1TF

When the VSWR on a new antenna is not as low as expected, it seems that there is a problem with the antenna. This may not be the case, and other tests of the antenna system need to be examined. I use the word **system** since the antenna system includes everything from the feedline connector, that attaches to the transceiver, to the antenna and the components used to mount or support the antenna. Those items in the system are, every coax fitting, each piece of coax, the VSWR meter, and any switches along the way, as well as the antenna and any metallic items in the space immediately around the antenna. When that new antenna fails to have a low VSWR, there are many questions to ask yourself, not just "What is wrong with the antenna?" You should be asking yourself "Is it the feedline or any of the coax fittings?" "Is it the VSWR meter?" "Is it a coax switch in the system?" "Is it the antenna?" "Is it something in the space near the antenna?" It is difficult to decide where the problem is before you ask yourself each of these questions. It is easy to take each question by itself and do tests to prove that each part is not at fault, or to find the fault in one of these sections. This month's article will be dedicated to troubleshooting the feedline and test equipment.

Checking The Coax Cable In The System

One of the statements I often hear is that the coax is good because it is new. Well, new coax should have a better chance of being good than old coax. However, just because it is new does not prove that it is good. Another statement often heard is that, "I tested the coax with an Ohmmeter, and it tested good." An Ohmmeter will not

When that new antenna fails to have a low VSWR,
there are many questions to ask yourself, not just
"What is wrong with the antenna?"
You should be asking yourself
"Is it the feedline or any of the coax fittings?"
"Is it the VSWR meter?"
"Is it a coax switch in the system?"
"Is it the antenna?"
"Is it something in the space near the antenna?"

Figure 1

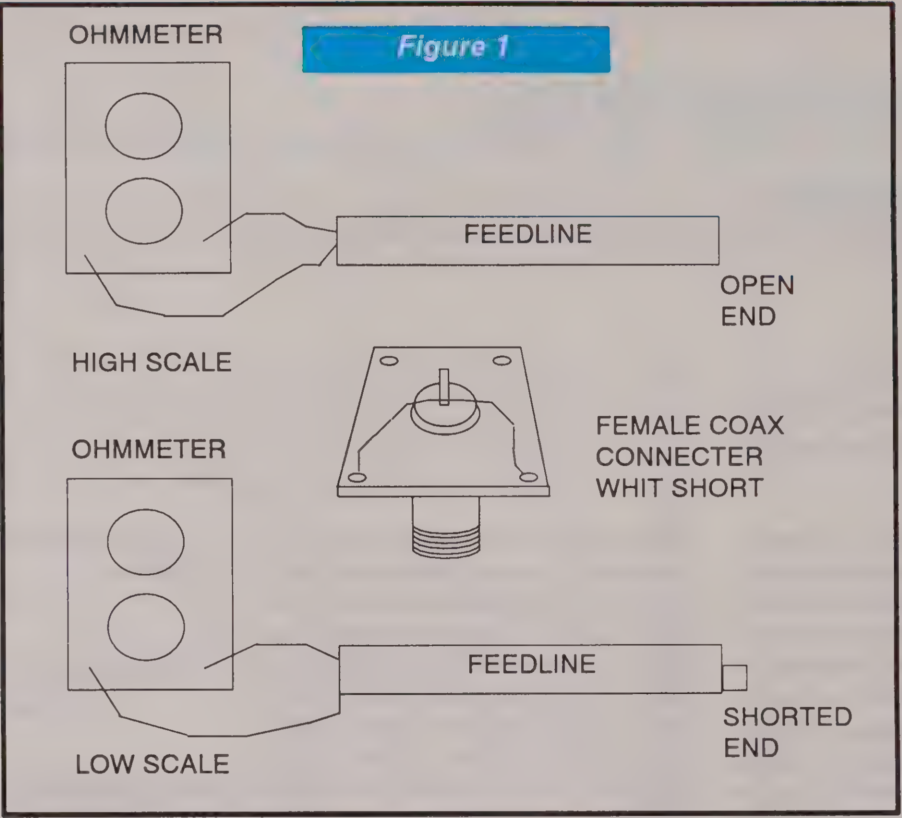
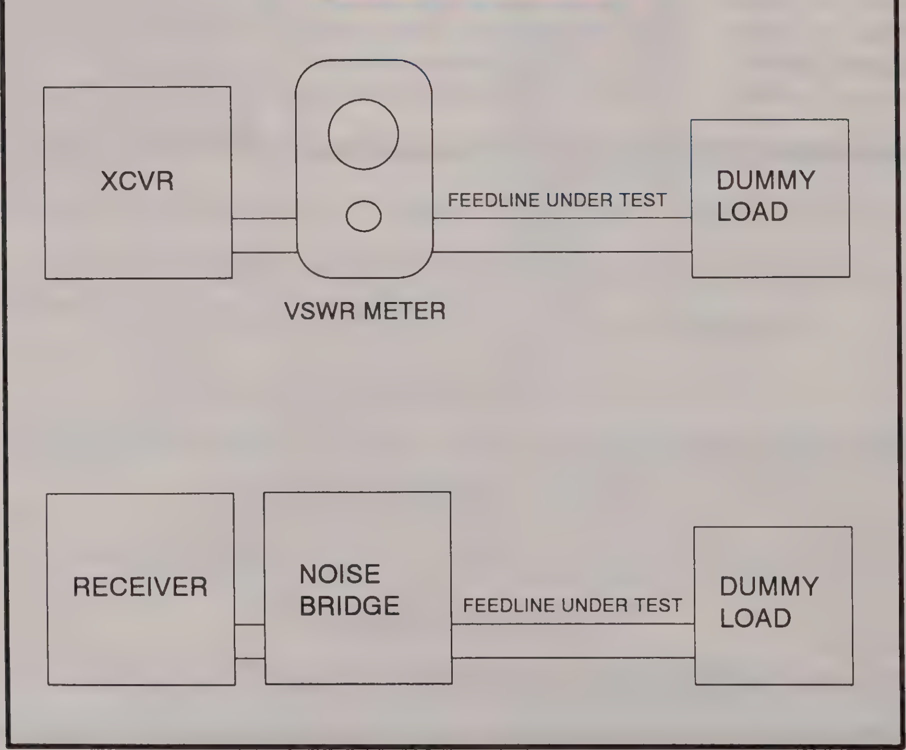


Figure 2



prove that coax cable is good. However, an Ohmmeter can be used to find most of the common faults in coax cable. Using a high Ohms scale, connect the Ohmmeter leads to the center pin and shield of the coax fitting. There should be nothing connected to the other end of the coax cable. Figure 1, top, shows the connecting points. The Ohmmeter should read a very high value, 10,000 Ohms or more. At this point you have proven that the coax cable does not have a short in it. One of the common problems that occurs when attaching a coax fitting to a cable is to let a strand of the braid get loose and end up connected to the coax fitting center pin. The Ohmmeter check will find this fault.

The next step is to prove that the cable has good connections to the coax fittings. If you are using PL-259 connectors on your coax cable, then make up an SO-239 connector (looks like antenna connector on back of HF transceivers) with a short across it as shown in Figure 1 center. Use heavy wire, #14 or larger, for this short and solder the ends to the holes in the fitting. Connect this shorted fitting to the far end of the coax cable being tested, as shown in figure 1 bottom. For the Ohmmeter test this short is more than needed, however a shorted coax fitting should be part of your test equipment.

1 Now use the Ohmmeter on a low Ohms scale and check the coax again. The reading should be 0 or at least a very low reading.

Any reading more that about 2 Ohms would be an indication of a possible bad solder joint at one of the coax fittings. At this point you know that the coax is not shorted or open.

I have often hear "I checked the feedline with an Ohmmeter and it tested good. Then I connected the feedline to the antenna and now the feedline shows that it is shorted. What is wrong?" Some antennas have a transformer at the input to the antenna. The popular Cushcraft AP8A vertical antenna has such a transformer. The AP8A transformer is a three terminal matching device that steps the 50 Ohm coax cable impedance down to 39 Ohms for the antenna feed point. The third point goes to ground. This type of antenna will always show a short when tested with an Ohmmeter. The advantage of using the transformer is a better match to the antenna and broader frequency response.2

To really test the feedline, you need a dummy load (50 Ohm) and a VSWR meter or a noise bridge. The dummy load needs to have the ability to dissipate 100 Watts for a minute or two, if feedline loss measurements are to be made.3 If a noise bridge is used, then a half Watt resister is very adequate. Figure 2 top shows the VSWR test equipment setup. Use the minimum power necessary to give deflection on the VSWR meter. If the VSWR meter shows no reflected power then you have proven that the coax cable and its fittings are not the cause of any problems. If a noise bridge (figure 2 bottom) is used, make sure that the bridge reads 50 Ohms and the reactance reading is zero. Part of any check, when testing coax cable, is to make tests on more than one frequency. It is possible for coax to test good at one frequency and be bad at some other frequency. If coax cable is tested at the lowest and highest frequencies to be used, then it is probably good at all frequencies in between.

> *Before you call the antenna manufacturer and complain about the antenna not working, you need to be able to tell them that the feedline has been checked, and has no reflected power when terminated with a dummy load. You also need to be able to tell them the VSWR at different frequencies on the band where the problem is noticed.*

Testing The Test Equipment

If confusion sets in during the checking of the feedline, then the thought that the test equipment might be at fault should be considered. Repeat the test of figure 2 top, but use another piece of feedline. Use as short a line as you have for these tests. If you have a male to male coax fitting, you could set up the test equipment with no feedline involved. Swap dummy loads. Do everything possible to prove that the test equipment works, (or does not work) and just which piece is at fault.

Conclusion

Divide the antenna troubleshooting effort into as many small parts as possible. Test each part to prove that it is not the cause of your trouble. One method of testing is to put the dummy load right at the transceiver and check the transceiver operation. Then move the dummy load up the feedline to the next connection and test again. Keep making checks until you get to the antenna connector. At this point, the dummy load is connected to the feedline and the antenna is not part of the system being tested. If this last test shows no problem, then the problem must be in the antenna or something close to the antenna.

Before you call the antenna manufacturer and complain about the antenna not working, you need to be able to tell them that the feedline has been checked, and has no reflected power when terminated with a dummy load. You also need to be able to tell them the VSWR at different frequencies on the band where the problem is noticed.

Next month: Troubleshooting the antenna.

Notes:

1 "Tyrrell, What can I do with a noise bridge?"
see feedline length measurements. Amateur Communications February 1993.

2 "Tyrrell, Do I have to put radials on my vertical antenna?"
Radioscan September 1992

3 "Tyrrell, Do Antenna Tuners Waste Power?"
Radioscan October 1992. See discussion on measuring matched line loss. ■

Some material for this article came from the author's book "Troubleshooting Antennas And Feedlines". This book is published by and available from MFJ, PO Box 494, Mississippi State MS, 39762. Phone 800-647-1800.

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Sunspots: Their Origin And Effects

Part II

By James G. Lee, W6VAT

One of the more important aspects of sunspots is their cyclical nature. While the so-called "eleven year average" between sunspot *maxima* and sunspot *minima* is used by most solar observers, it's just that! An "average". In reality, the sunspot cycle varies from about seven to 17 years between sunspot *maxima*, and from nine to 13 years between *minima*. The rising portion of a given cycle is normally faster than the decaying portion during a high, or medium sunspot cycle peak. Based on the eleven year cycle, the rising portion usually takes only about four years to reach the peak sunspot number, with the remaining seven years being the decaying portion of the cycle. FIGURE 1 shows examples of high, medium, and low cycles.

By a high to medium sunspot number, I mean a "smoothed" count over 100 for a high value, and between 60 and 100 for a medium value. The smoothed count is applied on a month by month basis since there is considerable variation here as well. The average smoothed value can vary from low of zero sunspots to a high of over 200. A study of twenty complete cycles from 1750 to 1960 showed an average low sunspot number of five, and an average high value of 108.

Cycles which don't reach the above high or medium sunspot count are normally more symmetrical with the sunspot peak occurring in the middle of the 11 year average. These cycles have a peak smoothed sunspot number in the order of 60 or less. The term "smoothed" means that as sunspots can vary from day to day, a count is kept for every month. Then the total number is averaged or smoothed to provide running count for each month as the cycle progresses. FIGURE 2 shows a graph of 14 sunspot cycles from 1830 to 1972.

The origin of these cycles is still not well understood. Since the sunspots themselves have distinct and often very strong magnetic fields associated with them, modern solar theories assume some kind of weak general magnetic field exists. How and why this field is brought to the Sun's surface and increases intensity at the sunspots is still unknown. Since the Sun is a highly conductive fluid sphere the exact shape of this general magnetic field could assume different shapes.

On Earth our magnetic field goes from pole to pole, although slightly offset from the geographic poles. Last month I mentioned circulating, or ring currents existing in our magnetosphere. This type of "toroidal" field could also exist as the Sun's field. Each type *polar* or *toroidal* could exist simultaneously in the Sun's interior. This is possible due to the fluid nature of the Sun and its different rotational period from the polar areas to its equatorial region. What this all means to us as *hams* is that there is no known method of reliable "long-term" forecasts of sunspot activity available at the present time.

Sunspots And Weather

Do sunspots affect our weather? In my first column I stated that if it were not for our Big Brother the Sun, life as we know it would not exist on Earth. But just how does it affect our life? If we turned to our friendly meteorologist on the evening news, he would say that he's more concerned with local temperatures, barometric pressures, humidity, zonal indices, and analysis of the air masses and doesn't need to add one more highly variable element to his calculations. And he's right, for he is more concerned with day-to-day prognostication, than with what is essentially "climatology."

As a bare minimum we have both the daily (*diurnal*) variation of the Sun over the Earth's surface, as well as the yearly or annual variations as the seasons change. Everyone knows that seasonal changes are related to the angle of the Sun's position in relation to the Earth. Winter in the Northern Hemisphere occurs when the maximum Sun angle is the lowest, yet this corresponds to summer in the Southern Hemisphere. Since the Sun heats our atmosphere, barometric changes occur. In general, warmer weather follows low barometric pressure, while clear, cold weather accompanies higher barometric pressure.

About the time of World War II, a meteorologist known as H. Clayton, began a serious investigation of solar influence on weather. He found that atmospheric pressure varied as sunspot numbers changed. He also found that there was more snowfall in New England during a sunspot maximum than there was during a minimum. He studied the Arctic and the Antarctic and found there were two to three times as many icebergs during sunspot maximums than there were at sunspot minimums. Other investigators corroborated his findings when their conclusions showed that temperatures in the temperate zones are colder when sunspots are most numerous.

About this time a scientist at Syracuse University made measurements over five sunspot cycles and found a distinct northern shift in the storm tracks over the United States corresponding to the position of the sunspots on the Sun. During sunspot maximums he found 40% more storms passing over the basic storm track in the US than during sunspot minimums. Some of you may be aware that we here in California have been in the grip of a five year period of much lower rainfall than normal. This corresponds to the five year peak of Cycle 22's sunspot maximum. The peak occurred around 1988 - 89, and is now declining. The result is that in 1991 we had 125% of normal rainfall, and as this column is being written, we are looking at 150 - 200% of normal rainfall as Cycle 22 declines.

We had a previous drought period which lasted two years from 1977 to78 during Cycle 21, (which not so coincidential) was eleven years prior to the peak years of Cycle 22. Those were the peak sunspot years of Cycle 21. It often happens that even numbered cycles have longer peaks than the odd numbered ones. For example, Cycle 20 had a flat peak for about 17 months when the smoothed sunspot number stayed at 106 ± 2.

Last time, I mentioned Rudolf Wolf who formulated an equation back in 1849 to correlate the sunspot observations worldwide. He also showed that there are six to eight violent hurricanes worldwide during years of maximum sunspots, while the average number is only one or two during minimum sunspot years. We all remember hurricane Hugo in 1989, and Andrew and Iniki in 1992, plus severe typhoons in southeast Asia.

Often in California people talk about "earthquake weather" but only in a joking manner. Yet our Loma Prieta earthquake here in the San Francisco Bay area occurred in October 1989 registering 7.1 on the Richter scale. It did considerable damage. Last year, the northern and southern parts of the state suffered several severe earthquakes which measured from 6.5 to 7.4 on the Richter scale. Also during this time there has been a considerable increase in volcanic activity, the most notable being Mount Pinatubo in the Phillipines. Yes, sunspots do affect weather, but do they cause earthquakes and volcanic eruptions? Probably not, but they could be a small contributor to the other factors involved in these geological happenings.

The Maunder Minimum

If you look at a tree stump after the tree has been felled you see a distinctive array of "rings" emanating from the center of the stump. This pattern can also be seen on the ends of boards in a lumber yard. Each "ring" represents one year's growth in the tree and by counting them a good idea of the tree's age can be made. In years of good rainfall, the distance between rings is large. In years of drought, forest fires, or other adverse conditions, the rings are very close together.

Many years ago, Professor A. E. Douglass of the University of Arizona began to wonder if there was a verifiable connection between tree growth and sunspot cycles. Douglass was both an astronomer and an archaeologist, and while roaming the Arizona forests he noticed that periods of retarded growth alternated with periods of rapid growth on many of the trees. These periods varied between ten and twelve years in many cases. So he began to count tree rings by the thousands to see if there was a connection.

In order to count the tens of thousands of tree rings to provide an adequate statistical basis, he developed an optical device to help in this task. He examined the pines of Arizona, the redwoods in California, and the giant Sequoias of the Pacific Northwest. In a relatively short time he discovered distinct intervals of seven, eleven,

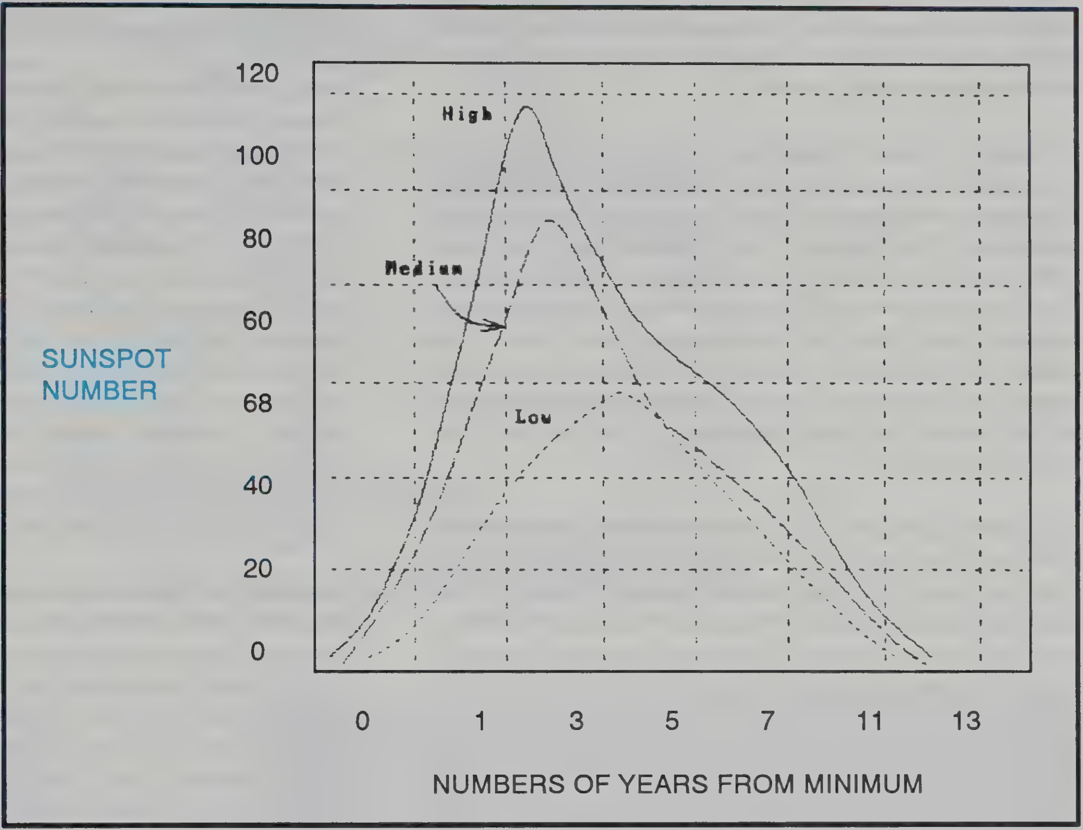

*Figure 1.
Tipical Rise and Decay of Sunspot Curves for High, Medium, and Low Sunspot Numbers. Note the Asymmetry of the High and Medium Curves.*

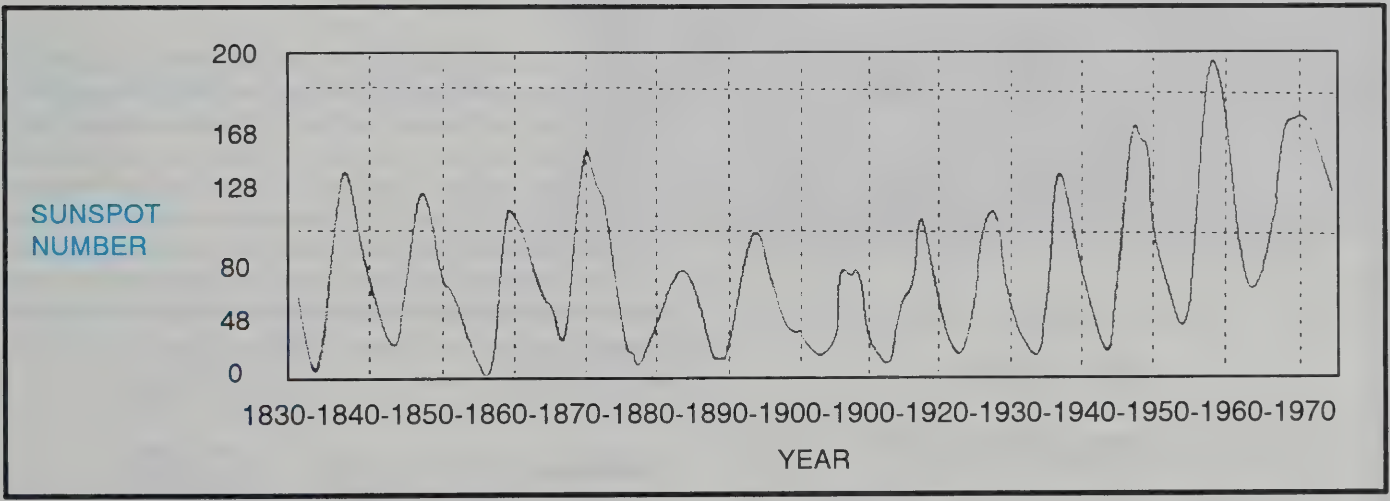

*Figure 2.
Sunspot Cycles 7 through 20 (1830 - 1972) Showing the peaks approximately 11 years apart on average*

twenty-three, and even longer intervals to which the tree growth had responded. He began to recognize the telltale patterns of forest fires which also retarded growth among the surviving trees.

In order to synchronize all of his findings he needed to accurately date each one to correlate similar patterns between living trees and trees which had been felled in years past. Beginning with newly felled trees, he started with their ring pattern and correlated it to the calendar. Then armed with this information he correlated these patterns with older and older trees back through the years. By using this scheme, he was able to cross-correlate Arizona trees back nineteen hundred years, and in the case of the Sequoias he was able to go back thirty-two hundred years.

Still there were gaps in his records. Being an archaeologist, he knew that somewhere in the ancient pueblos of the Southwest there should be ancient timbers with which he might be able to fill in the gaps. He concluded that by tracing the chronology of bits and pieces of pottery in these old pueblos he could locate old timbers of the same time period as his gaps. He was correct and after long years of study he was able to fill in all but one of the gaps.

During the time between 1645 and 1715 Douglass' records showed no sunspot activity that he could discern. Over this seventy year period there should have been a number of solar cycles with verifiable maxima and minima, yet his records showed just the opposite. Then one morning in 1922, to his surprise, he received a letter from Professor E.W. Maunder of the Royal Observatory at Greenwich, England, which filled in the gap. Maunder knew of Douglass' efforts, but not of his difficulty in this area. Maunder said that he had been researching early sunspot records, and realized the records indicated a great absence of sunspots during this period. He said that if Douglass' theory on the relation between sunspots and tree ring growth was valid, the tree ring data should also show this lack of sunspot activity.

Douglass had been ready to give up on his theory when Maunder's letter arrived and prevented him from discarding many years of intensive observation and study. This long period of no sunspot activity has become known as the ***Maunder Minimum***. It has been further confirmed through Carbon-14 dating methods. There is one other period between 1460 and 1550 which also shows a similar type minimum. Today most knowledgeable scientists accept Douglass' work as valid, and the University of Arizona continues the work of Douglass in the Tree Ring Laboratory he founded there.

Next time we'll continue on our interesting journey in propagation concepts by lifting our attention up from Earth to the high upper reaches of the atmosphere. Here the ionosphere provides us the ability to communicate over long distances. We'll look at not only the history of the discovery of the various layers of the ionosphere, but also at their characteristics. We'll begin to examine them in some detail to provide a good understanding of how they affect our communications capability on the plus side as well as the minus side. ■

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2. Stetson, H. T., "*Sunspots in Action*", 1947, The Ronald Press Company, New York, N. Y.
3. Jacobs, G et al, "*The Shortwave Propagation Handbook*", 2nd Edition, 1982, CQ Publishing, Inc, Hicksville, N.Y.

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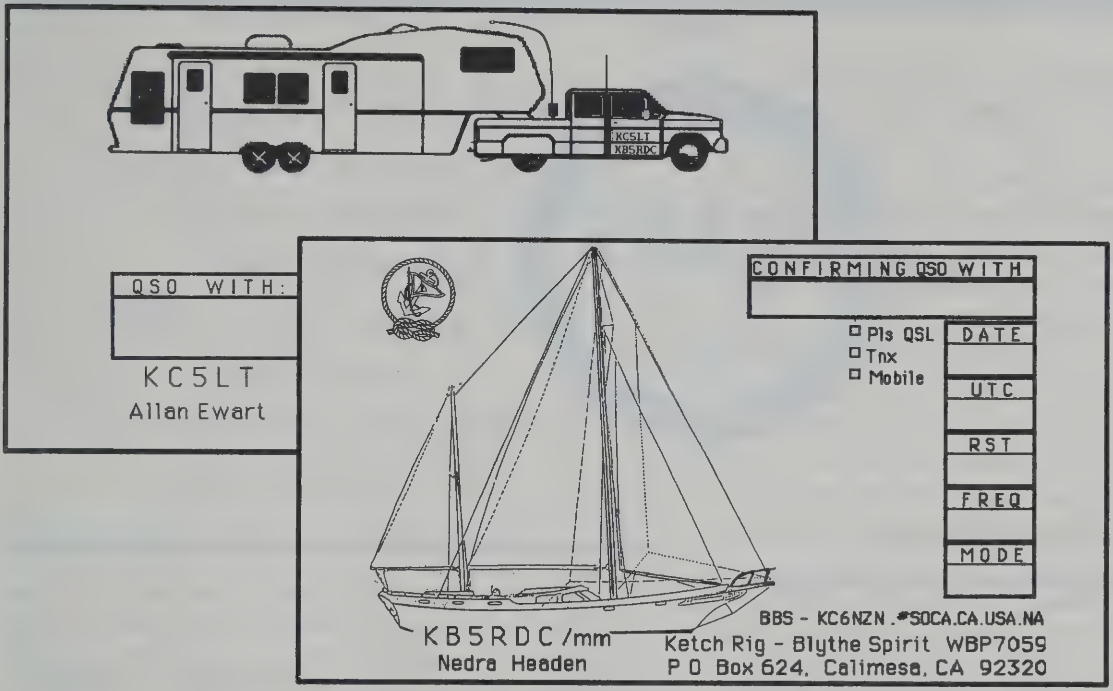
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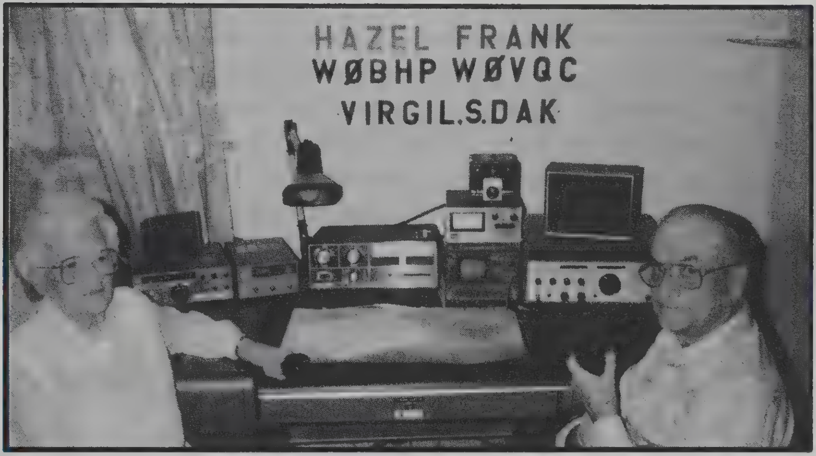

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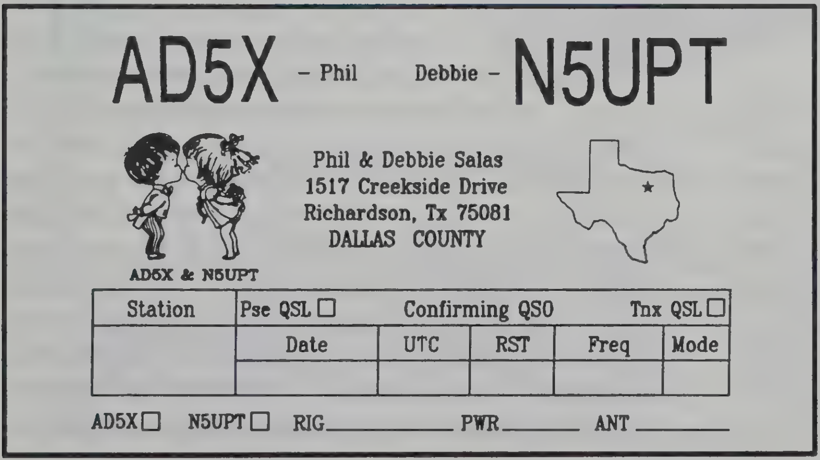

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MARS - We Also Serve

By Lorraine S. Matthew N4ZCF/AAM3PR

The first Army MARS IPR (In Progress Review) Conference of 1993 was held at Fort Sam Houston commencing on the 27th of January and ending on the 2nd of February.

This meeting of the Army MARS leadership begun the process of developing, reviewing and examining the many elements of the Army MARS program. The IPR process will be continued with a second Army MARS Conference in April. Only after all this effort will the effects of decisions made at these two conferences be felt in the field. Many of the items discussed may not be felt at all or may be implemented at various times ranging from immediacy to, perhaps, several years. The Conference attendees include Army planning personnel, Army MARS Chief Sutton and members of his staff, the Army MARS Area Directors, and other key personnel critical to the leadership of Army MARS. It'll be most interesting to study the policies and procedures that may be issued following the April meeting.

Chief Army MARS, Bob Sutton, and Eastern Area Director, Fred Neff, are, at this writing, attending the Interagency Hurricane Planning Conference being held in Miami during this last week in February. Chief Sutton is making a formal presentation to the conferees about the capabilities and advantages offered by Army MARS in hurricane situations. A number of Federal agencies were co-sponsors, but this conference is largely a National Weather Service endeavor. We, in Florida, will be watching the outcome of this conference with great interest.

Updates on the traffic flow for Somalia show that the message traffic continues to flow only one way - outbound from Somalia. The delivery system inside the country was non-existent to begin with and continues to be most difficult at this time. Such difficulties dictate the necessity of giving full priority to official military traffic inside the country. Messages from Somalia are flowing smoothly to the families and loved ones waiting at home to hear from their people who have been deployed to the area.

The subject of encouraging morale traffic always brings up the question, "Does the morale traffic role played by Army MARS tend to overshadow the primary mission of MARS?" It's certainly the role recognized most by the military personnel and the public whom we serve. It is this recognition that may become more and more important to the MARS program.

It has been expressed to me by many knowledgable people, and it is my opinion that morale traffic is very vital to our primary mission of providing emergency communications. The best training mode available to the Army MARS member is the handling of "real-time" genuine message traffic. MARS Exercise traffic made up for the purpose of training can give valuable information and practice, but the lack of spontaneity can serve only partially to prepare operators for a real need situation. The advantages of generating a lot of morale traffic include the necessity of passing that traffic immediately regardless of band conditions. An abundance of morale traffic also requires the use of message centers, and a

The subject of encouraging morale traffic always brings up the question, "Does the morale traffic role played by Army MARS tend to overshadow the primary mission of MARS?".

variety of modes in transporting the traffic, and the constant testing and evaluation of Army MARS capability to handle traffic under all conditions. A concomitant advantage of morale traffic is the good morale that is produced within the ranks of MARS as well as the originator and the recipient.

In recognition of our primary mission of being communicators in times of need, we need to keep the morale messages going. To quote a bulletin issued by AAR1FL ME (Training officer from the state of Maine), "The more we handle, or keep the ears tuned-in while traffic is being passed, the more automatic our responses become". "When the fur is flying it's no time to crack open the manual to look up a proword or procedure". It's also no time to be learning a new mode or technique. The flow of morale traffic offers us unique training and the support of originators and recipients alike.

Hamfests continue to be excellent locations for the delivery of information about MARS and for the recruitment of new members. It is part of the Eastern Area Army MARS Public Relations policy that every hamfest should have a

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MARS table or booth. A delightful promo for radio, TV, and newspapers was sent to me by its creator, Barbara Rae Weirich/AAM3EC (newly appointed Eastern Area Army MARS Emergency Coordinator). She has used this promo in New York State.

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So why not call today?

Barbara Rae Weirich

(Note:Barbara did include her address and telephone with each use of the promo.)

Generation of traffic is up to each and every one of us. Generation of traffic can also serve a political role in the sense that a radio-aware America will be a supportive America. ■

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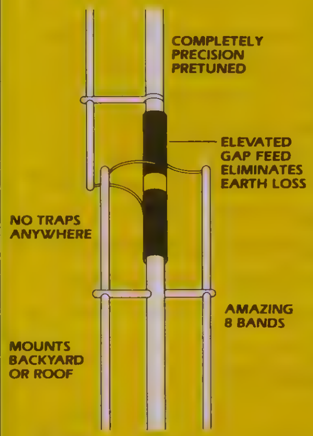
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FAIRS Members Planning project in Bangladesh

By David Larsen, KK4WW
Gaynell Larsen, KD4GMV

V Gaynell and I, first visited the Bangladesh embassy in January of 1992. At the time a trip was being planned to Dhaka, Bangladesh to help train amateur radio operators and to assist in establishing an amateur radio emergency network. We met with Dr. Toufig Ali, a minister at the embassy, and discussed amateur radio in general, specifically how it may be helpful to Bangladesh. Dr. Ali liked the ideas and accepted an invitation to visit FAIRS headquarters and our home for a weekend to learn about amateur radio.

Victor Goncharsky UB5WE (Right) explaining how a training DX expedition to Dhaka Bangladesh would help their citizens to become amateur radio operators and develop an emergency network, listening are Dr. Toufig Ali (Left), Minister of the Bangladesh Embassy, Washington, D.C. and David Larsen KK4WW (center)

Dr. Ali and his wife, Furdaus, spent a weekend in April 1992 at our home (KK4WW and KD4GMV). Various modes of amateur radio operation were demonstrated. We also discussed the many aspects of how amateur radio could be used in emergencies and how it would encourage people to become involved and skilled in electronics. It was easy for Dr. Ali to see the positive aspects of amateur radio and he agreed to help FAIRS in any way he could from the Washington Embassy.

Executive Director of FAIRS. Bangladesh Embassy HF communications system. Victor Goncharsky (Left) tuning HF equipment on SSB as Gorden Garrett (Right) KC4DY gives helpful asdvice.

During the many visits with Dr. Ali we learned the embassy's HF radio communication system didn't function and offered to help make the system operational. During Victor Goncharskay's November visit (Director of European operation for FAIRS, UB5WE), we made two trips to the embassy in Georgetown. During the first visit, we learned that the coax and antenna rotator cable to the log periodic antenna had been cut by the embassy complex manager because he didn't like the looks of the cable going down the outside of the building. We had a difficult time locating where the cables ended up until we called the building maintenance supervisor. He said he was sure the ends of the cut cables ended up over the ambassador's bathroom. He had been instructed to remove the cables from the outside of the building and drop them down an air ventilator which ended up inside the bathroom. An inspection to the ambassador's bathroom with a stepladder to look above the false ceiling confirmed the cables were there. Victor and I couldn't do more and informed the embassy folks we would be returning in several weeks with the necessary coax and rotor control cable to extend the cables from the ambassador's bathroom to the radio room.

(Continued on page 51)

The Key City Amateur Radio Club

Hamfest will take place Saturday and Sunday, May 1-2, at the Abilene Civic Center, in Abilene, Texas. Doors open 8:00am to 5:00pm on Saturday and 9:00am to 3:00pm on Sunday. Talk-in on 146.160/760.

Admission is $7. Free parking, VE exams and wheelchair access available. For reservations and further information, contact Peg Richard, KA4UPA, 1442 Lakeside Dr., Abilene, TX 79602. Phone (915) 672-8889.

……

The Stanwood-Camano Amateur Radio Club

Presents its second annual electronic flea market and swap meet to be held Saturday, May 1. Location: 1 mile south of Stanwood on Pioneer Hwy. (SR 530). Come south off I-5 from Conway or come west from I-5 exit 212. If you wish to hold seminar or lecture, free space may be available. Doors open 9:00am to 3:00pm. Talk-in on 145.19 repeater or 147.57 simplex.

Admission is $3. For further information, contact Mark, WA7UGB, at (206) 387-1097 or write to SCARC, P.O. Box 941, Stanwood, WA 98292.

The Triple States Radio Amateur Club

Presents its hamfest and computer show on Sunday, May 16 at Wheeling Park, Wheeling, West Virginia. Doors open 8:00am to 3:00pm. Talk-in on 146.910 and 146.715.

Admission is $3. Women admitted free as well as youths 17 years old and younger. Free parking and overnight RV parking available. For more information and advanced tickets contact
TSRAC,
P.O. Box 240, RD #1,
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CLUB CORNER

The G-QRP Club

Was founded in 1975 and today membership has risen to 4,000 worldwide. The club exists to promote interest and growth in low power amateur radio communications (5 watts or less). Membership is open to any licensed radio amateur or short wave listener anywhere in the world.

The club publishes a quarterly journal called SPRAT which is sent free to members. SPRAT contains many circuits, technical hints and ideas for QRP construction projects, as well as club news, contest, award information and other items of interest to QRP operators.

A datasheet service is also provided free to club members. The sheets cover articles of QRP interest, many from overseas magazines.

Weekly club activity takes place each Sunday between 1100-1230 and 1400-1500 GMT on the International QRP Frequencies (3560, 7030, 10106, 14060, 21060 and 28060 kHz). Special “Activity Weekends” are held at least twice a year and at the end of December a “QRP Winter Sports” is promoted. The club also supports other international QRP contests and activities.

For more information write to G-QRP Club Membership Secretary, David Jackson, G4HYY, Castle Lodge West, Halifax Road, Todmorden, OL14 5SQ, England.

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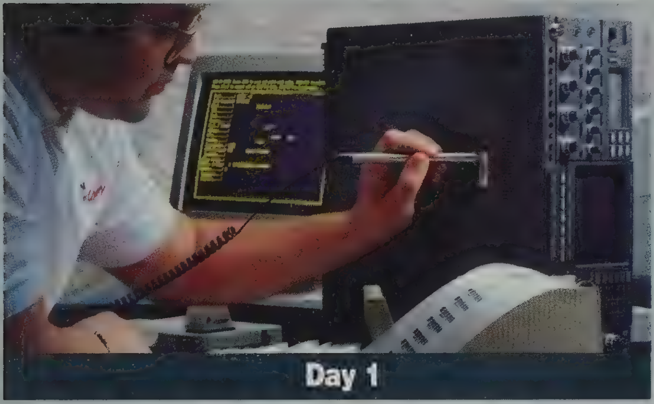
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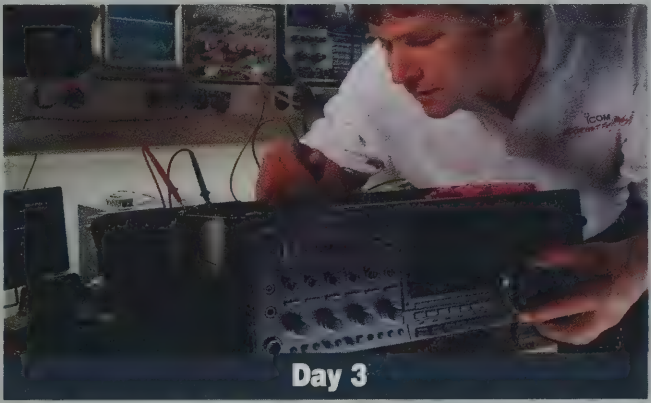
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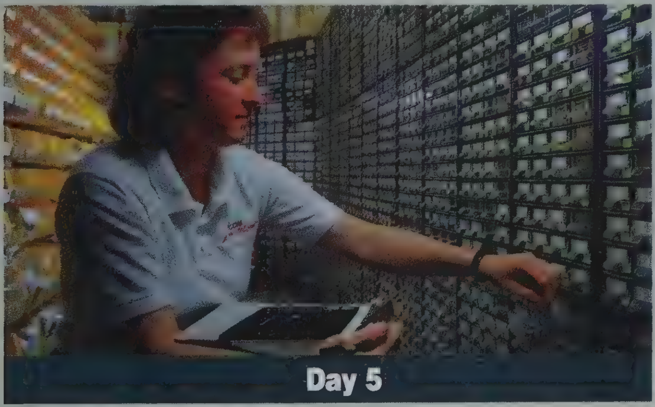
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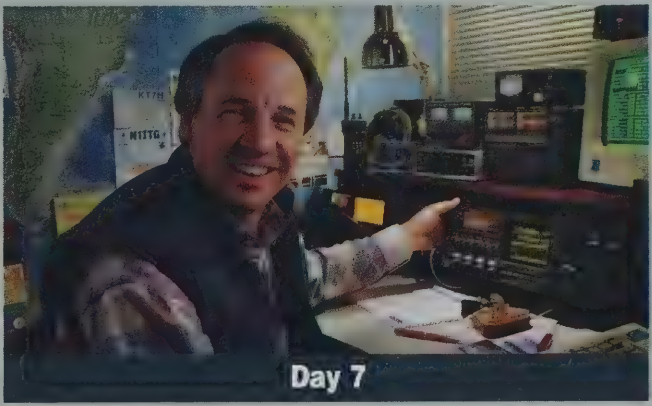
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CIRCLE 64 ON READER SERVICE CARD

Getting Along With Other Radio Services

By Frederick Maia, W5YI

Three FCC Public Notices were issued during March which underscores the fact that we as amateurs should get used to the idea of sharing spectrum with other services. Actually most VHF and higher frequency spectrum is shared. The three news items that the FCC released concern the 220, 420 and 902 MHz ham bands.

Allocation of 219-220 MHz for use by Amateur Service

Everyone is well aware that, until August 1991, the Amateur Service had access to the entire 220 to 225 MHz band on a secondary basis. The FCC separated this shared spectrum into two exclusive segments. The primary reason given was to accommodate new narrow-band technology which would not be compatible with amateur operations.

Narrow band business radio got the 220-222 MHz portion, and Ham radio was allocated the remaining three megahertz, 222-225 MHz. The biggest loss was at 220.5 to 221.9 MHz which amateurs used for control links. They were also beginning to establish an intercity packet radio network in this band.

Packet radio signals are used to transmit digital data in groups or packets using a specified format. Radio channels used by these systems are occupied only during the time individual packets of data are actually being transmitted. Upon completion of transmission, the channel becomes available for other traffic.

Amateurs use packet radio for transmitting a variety of information, including (1) graphic images, (2) computer programs,(3) messages and (4) data bases. These systems can also be used in times of emergency when other communications facilities are out-of-service or overloaded to efficiently carry a large volume of messages. Amateur radio operators plan to use wideband backbone packet radio networks to provide intercity links of their local packet radio systems.

According to the American Radio Relay League, "The loss left the Amateur Radio Service without a reasonable substitute for such high-speed links, and the development of a truly unique nationwide communications system with unparalleled emergency preparedness and national defense capabilities."

The FCC received more than 550 requests in 1991 asking that they review the 220-222 MHz reallocation. In response to these Petitions for Reconsideration, the FCC said they thought that in certain areas of the country, some relief was indeed justified. They said the Commission would entertain a request for replacement spectrum and asked ARRL to make a specific proposal showing how amateur operations could use shared spectrum without causing interference to existing users.

The FCC received more than 550 requests in 1991 asking that they review the 220-222 MHz reallocation. In response to these Petitions for Reconsideration, the FCC said they thought that in certain areas of the country, some relief was indeed justified.

After considerable amateur and professional testing, the American Radio Relay League filed a petition with the FCC, Which asked for access to 216 to 220 MHz on a shared basis to "...provide reaccommodation for present and future wideband date intercity links and other point-to-point fixed amateur stations... displaced from the 220-222 MHz band." ARRL said it was not possible to relocate displaced data operations at 222-225 MHz due to the existence of extensive 1.25 meter repeater networks.

To reduce interference, the League agreed that amateur activity at 216 to 220 MHz should be managed. A power level of 50 watts was suggested as well as specific frequency coordination. "The absolute responsibility to avoid interference would be placed on the amateur service licensee."

On March 5th, the FCC released a bulletin stating that it would adopt a Notice of Proposed Rule Making to provide "...a secondary allocation for the Amateur Service in the 219 to 220 MHz band to be used for amateur auxiliary station (point-to-point) packet backbone networks and other amateur point-to-point fixed communications." The Commission also recommended operating limits and other measures to ensure that these amateur operations do not cause interference to primary operations in and adjacent to the 219-220 MHz band. We will not know the extent of these controls until the exact text of the NPRM is issued.

The FCC "...believes this action will foster technological experimentation and innovation, particularly with higher data rates, facilitate the construction of a nationwide packet data backbone network [and will] "relieve congestion in the 222-225 MHz band in certain geographic areas." The FCC concludes that "...the amateurs' ability to perform interference analysis, the directional nature of the proposed services, and the secondary status of this proposed allocation should adequately protect all primary and existing secondary operations in and adjacent to the 210-220 MHz band." The Commission has asked the public to comment on the proposal.

FCC to Allocate 449 MHz for Wind Profiler Radar Systems

On March 10th, the FCC proposed to allocate the 449 MHz band for wind profiler radar systems and asked the public whether they should be accommodated in the 915 MHz band as well. This really was not a surprise since the government has been investigating several VHF and UHF homes for wind profilers for several years now.

The first thing that comes to mind to most of us is that 420 to 450 MHz is allocated to the Amateur Service. Does this mean that the Amateur Service is losing access to more spectrum? The answer is no! We must

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remember that Amateur Radio uses the 70-cm ham band on a secondary basis. What it does mean is that we will be gaining another sharing partner.

The primary user of the 420-450 MHz band is Government Radiolocation. Government frequency assignment is made by the NTIA (National Telecommunications and Information Administration) and not the FCC. First, let's examine exactly what are wind profilers.

Wind profilers are sensitive, ground-based pulsed radars that measure wind speed and direction in real-time at a variety of altitudes between 1500 and 53,000 ft. This is the altitude flown by the nation's airliners. Basically, upper altitude wind profiles are obtained by processing a return Doppler radio signal. This information has many applications, including detection of severe wind conditions and planning flights in aviation; improving weather forecasting in meteorology; and analyzing movement of air masses carrying pollutants for environmental studies.

An NTIA study found that 420-430 MHz is used for Amateur TV (ATV) and by the military. The 430-440 MHz band contains many military radars and drones. In addition, the band is populated by Amateur satellite operations. The 440-450 MHz band is used the least by the government. Amateur use is for repeaters at 442-450 MHz and ATV operations at 438-444 MHz.

Currently, wind speed and direction is determined by the National Weather Service using expendable balloon-borne instruments called radiosondes. Wind profilers offer big advantages over radiosondes. They operate faster, automatically, cheaper and do not have to be carried into the altitude by balloons.

Experimental wind profilers have been operating at 404 MHz, but are interfering with certain satellite uplinks in an adjacent band, and a new home for wind profilers had to be found. While propagation characteristics require that wind profilers operate in the 50-1000 MHz range, efforts to find spectrum for wind profilers have focused around 200-500 MHz; specifically 216-225 MHz, 400 MHz and 420-450 MHz. At 216-225 MHz there was a concern about possible interference to TV channel 13 which is located at 210-216 MHz ...and to the Maritime Mobile Service (216-220 MHz). The 50 MHz and 900 MHz band also were extensively considered.

NTIA noted that the 420-450 MHz band is allocated on a primary basis to the Government Radiolocation service and is the only 30 MHz of spectrum available for military radiolocation below 1 GHz nationally. The Amateur Service uses 420-450 MHz on a secondary basis.

An NTIA study found that 420-430 MHz is used for Amateur TV (ATV) and by the military. The 430-440 MHz band contains many military radars and drones. In addition, the band is populated by Amateur satellite operations. The 440-450 MHz band is used the least by the government. Amateur use is for repeaters at 442-450 MHz and ATV operations at 438-444 MHz.

"To minimize the impact on current military operations, a frequency near the upper and edge would be more desirable. As a result, 449 MHz (2 MHz necessary bandwidth) has been identified. The disadvantage of 449 MHz is the impact to the amateurs repeater operations in the 442-450 MHz band," the NTIA report said.

Consideration for wind profiler operations was given to 441 MHz, but the Government concluded that this frequency has a larger potential to adversely impact U.S. military operations. NTIA acknowledged the heavy amateur repeater usage between 442 and 450 MHz. Depending upon local usage, approximately 80 repeater channels have 70-cm repeater inputs and outputs between 448 and 450 MHz.

NTIA is now recommending that wind profilers be accommodated at 449 MHz. Since the FCC regulates non-government spectrum use, they have now adopted an NPRM proposing 449 MHz for wind profiler radars.

The good news is that the impact on the Amateur Service should be minimal. Wind profiler radars are generally located in remote rural locations and not near the 30-mile radius of most 70-cm repeaters located in population centers.

Furthermore, the government has agreed to take whatever steps they can to minimize the impact of wind profilers on existing amateur repeater users. Installation of the wind profiler network is not expected to begin for another five to ten years.
That will allow plenty of time for repeater owners and wind profiler planners to determine what steps need to be taken to minimize interference to one another.

New Location and Monitoring Service to be at 902-928 MHz.

The 33-cm ham band at 902-928 MHz is admittedly lightly used by the Amateur Service. Theoretically, FM repeaters are supposed to be operating on the band with inputs at 906-909 MHz, matched with 918-921 outputs. Amateur TV and packet operation also have extensive band-planning at 33-cm. For the most part, however, 902-928 MHz is not used by the ham community.

Internationally, the 33-cm band is allocated to the Fixed Service, but in the United States, it is an ISM (Industrial, Scientific and Medical use) band with a center frequency of 915 MHz. ISM bands are often referred to as "junk" bands since they provide a home for almost any device that radiates energy and anyone who uses an ISM band must accept any harmful interference caused by these applications.

On March 11th, the FCC said they would be permanently allowing use of 902-928 MHz to automatic vehicle monitoring (AVM) systems. "The proposed allocation would replace existing interim rules adopted in 1974, thereby creating a more stable environment for AVM systems to operate," FCC said.

AVM systems are used to locate and track vehicles using non-voice methods, and to relay information to and from vehicles. The Commission said these systems will likely constitute important components of the future Intelligent Vehicle Highway System and facilitate tracking of cargo in the trucking, railroad and maritime industry.

The FCC proposed to expand the service to encompass location of all objects, animate and inanimate, and to allow licensees to provide service on a private carrier basis to individuals, the Federal Government and business band users.

The AVM Service will be renamed the "Location and Monitoring Service" (LMS) which the FCC defines as the use of non-voice signalling methods from and to radio units to make known the location of such units. "LMS Services will greatly benefit the public interest by promoting more intelligent use of our nation's highways and more efficient use of scarce resources," FCC said in a news release.

LMS units may also transmit and receive status and instructional messages related to the units involved. The FCC said that this definition will give licensees the flexibility to use LMS systems to monitor and locate any object and will greatly expand the potential uses for such systems. The FCC asked the public to comment on whether LMS systems and others using the band will be capable of handling any congestion.

The FCC suggested that wide-band LMS systems be licensed on the 904-912 and 918-926 MHz bands and narrow-band LMS systems at 902-904, 912-918 and 926-928 MHz. The Commission believes that wideband systems are capable of operating in a shared environment, but asked if there is a need to provide spectrum exclusivity for some period of time.

Amateur frequency sharing requirements

Sharing our spectrum with other radio services and the U.S. Government is covered in the Amateur Service Part 97 rules at 97.303. Since the Amateur Service is a secondary user of all UHF and higher frequency spectrum, we simply have to accept any interference that might be generated by those services designated as primary. ■

> *On March 11th, the FCC said they would be permanently allowing use of 902-928 MHz to automatic vehicle monitoring (AVM) systems. "The proposed allocation would replace existing interim rules adopted in 1974, thereby creating a more stable environment for AVM systems to operate," FCC said.*

LEO'S TREETENNA...

Is This A New Antenna Discovery? It Looks Like ONE Of A Kind! (See page 34 for details)

By Leo Bloom, KD4ZS

Well, this is not exactly an antenna! It's my big avocado tree, that must be about 100 years old, and has been giving us shade in our backyard for over 40 years had a weak point near the base of the tree. High winds as produced by a hurricane would cause it to split at the base, and kill the tree. Five years ago I decided to brace the upper portions of the tree with steel rods attached to the heavier upper structure. Then Hurricane Andrew came through the Miami area with a vengeance, with winds over 140 miles an hour. I just couldn't believe the damage to all my trees, except the steel avocado tree. It seems that all my work paid off, because there was very little damage, except minor loss of leaves. The steel has done so well in holding the tree together that I think I'll attach some coax and load it up to my rig. This would be a most unusual antenna having a tree as a ground plane. ■

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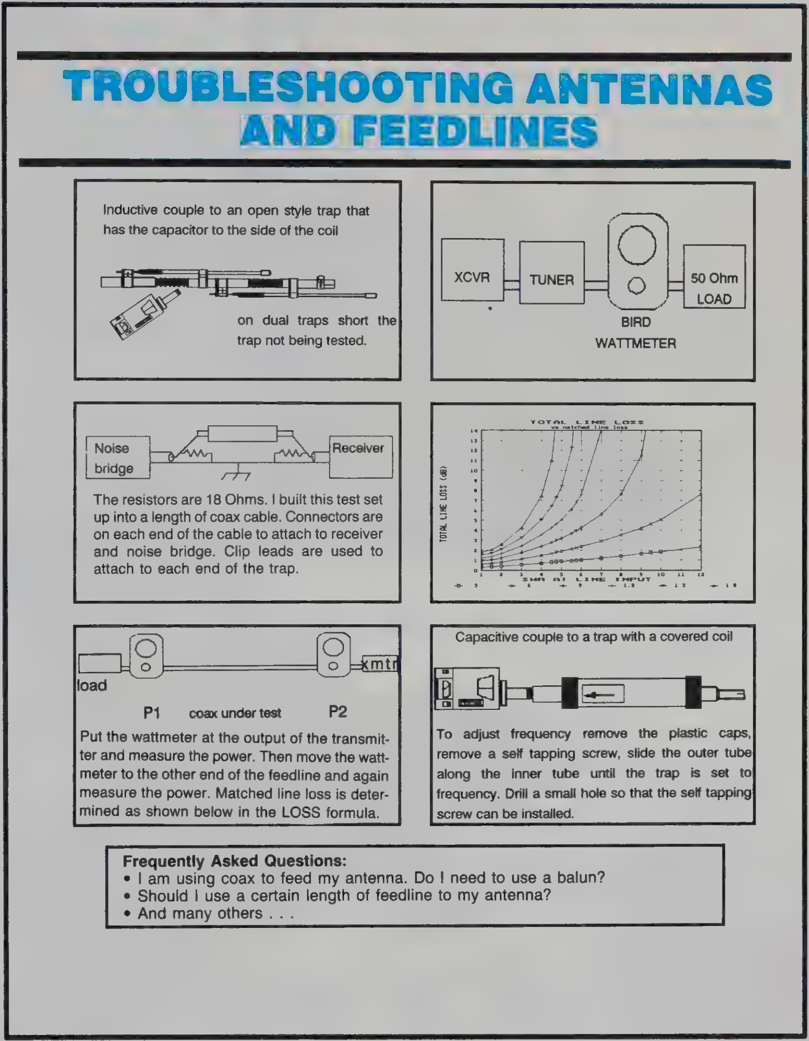
By Leo Bloom, KD4ZS

For the ham who doesn't want to get in to too much technical information about antennas and feed lines this book by *Ralph Tyrrell* W1TF is just the one for you. It's easy reading and gives you clear and concise information.



TROUBLESHOOTING ANTENNAS AND FEEDLINES

Inductive couple to an open style trap that has the capacitor to the side of the coil

on dual traps short the trap not being tested.

The resistors are 18 Ohms. I built this test set up into a length of coax cable. Connectors are on each end of the cable to attach to receiver and noise bridge. Clip leads are used to attach to each end of the trap.

Put the wattmeter at the output of the transmitter and measure the power. Then move the wattmeter to the other end of the feedline and again measure the power. Matched line loss is determined as shown below in the LOSS formula.

Capacitive couple to a trap with a covered coil

To adjust frequency remove the plastic caps, remove a self tapping screw, slide the outer tube along the inner tube until the trap is set to frequency. Drill a small hole so that the self tapping screw can be installed.

Frequently Asked Questions:

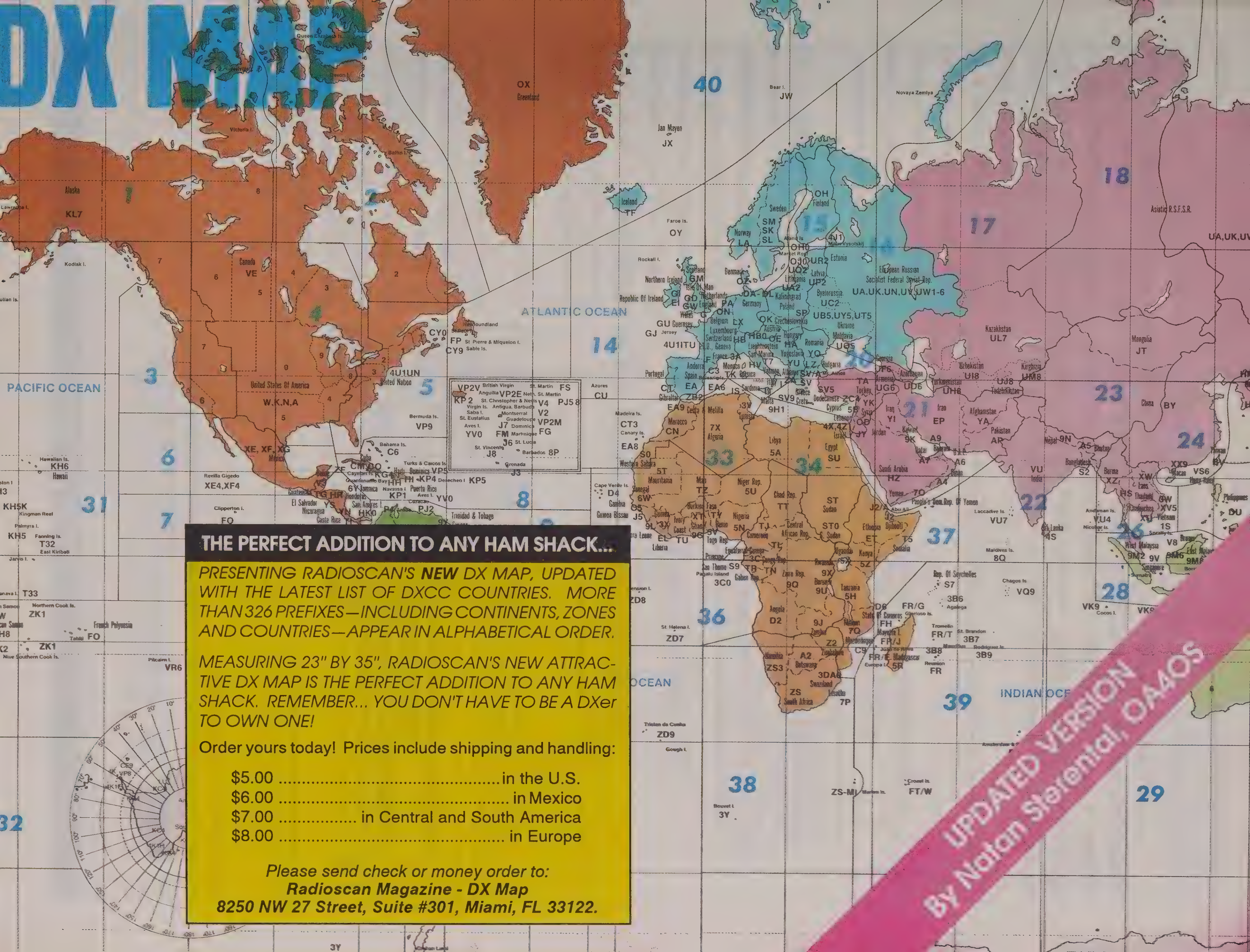
- I am using coax to feed my antenna. Do I need to use a balun?
- Should I use a certain length of feedline to my antenna?
- And many others . . .

The chapter are divided into interesting on testing of antenna traps, using a noise bridge, symptoms of a poor ground, troubleshooting different types of antenna's, testing a feed line using a noise bridge or antenna bridge and other items of interest to the ham.

The author *Ralph Tyrrell* W1TF was the first licensed in 1950. Having many years in commercial and ham radio and working for a mayor antenna manufacturing company as their technical support on the phone, talking to thousands of amateurs about their antenna problems, he finally decided to write this book when he retired.

The 59 pages, 81/2 x 11, soft cover volume is printed on non glossy (good quality) paper and has numerous diagrams and charts throughout.

Troubleshooting Antennas and Feedlines, by Ralph Tyrrell, W1TF is published by MFJ Enterprise, Inc. Mississippi State, MS 39762 U.S.A.



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TM-742A/TM-942A

Kenwood announces two new VHF/UHF multi-band transceivers. The TM-742A is a 144/440 MHz, tri-bander with third band optional, and the TM-942A is a 144/450/1200 MHz tri-band FM transceiver.

These new transceivers have all the features and selling advantages of the TM-741A and TM-641A, with the following enhancements: unit separates into three parts (frequency display, control panel, radio chassis), dual/triple receive, DTSS pager function built-in, direct frequency entry into VFO using DTMF microphone, a new adaptor which allows connection of two microphones.

CIRCLE 53 ON READER SERVICE CARD

Mini 2M/440 MHz HT Antenna

Comet Antenna introduces the newest addition to their line of Multi-Band antennas, the CH-32 "Miracle Baby" Mini HT Antenna for 2M/70cm.

The CH-32 has surprising performance, is only 1.75 inches tall, has a black matte finish, and a BNC connector. It is designed with a pivoting head, which is shock absorbent and protects the radio's connector from damage.

The CH-32 meets the modern operator's need for a small, compact antenna that easily works nearby repeater systems, and is useful for communicating in situations like hamfests, field day, tower work, etc. Its small size makes it inconspicuous, and proportionate in size to the newest HT transceivers.

CIRCLE 54 ON READER SERVICE CARD

PRODUCT HIGHLIGHTS

F251A And F252A Audio Distribution Amplifiers

Falcon Communications, announces the new F251A and F252A Audio Distribution Amplifiers. The F251A is a compact unit featuring a low distortion 3-watt amplifier that connects between one of seven rigs or home brew projects and one of four speakers via front panel switches. It is a neat and convenient way to minimize entangled station cables and a terrific asset for multiband setups or larger shortwave monitoring systems.

The F251A features a low input and low output impedance so volume at any given speaker does not noticeably change as outputs are added or removed. The unit is equipped with standard RCA [phono] jacks on inputs and screw terminals on outputs and requires 13.8 volts DC supply. Amplifier gain is internally adjustable, flexible, and of top audio quality. Also available is model F252A with dual amplifiers and 7 and 8 output channels.

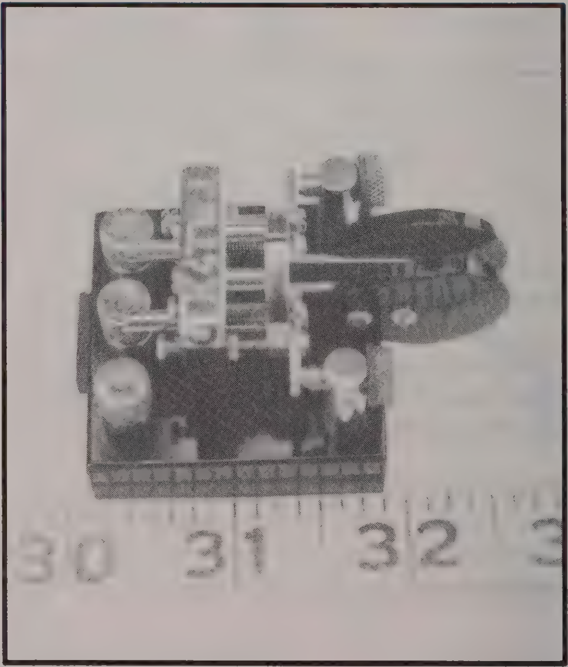
CIRCLE 55 ON READER SERVICE CARD

Three-in-One Miniature Twin Paddle

G4ZPY Keys and Paddles International introduces the Three-in-One miniature twin lever paddle Although the Three-in-One is suitable for home station use, it's specially designed for QRP, mobile, and backpacking applications.

This pocket-size paddle consists of a polished brass mechanism assembled with chrome screws, and fitted with tiny oval black fingerpieces. This design gives the Three-in-One the same feel as G4ZPY's full size VHS Iambic Paddle. Elongated tubes/adjustments on the rear provide separate tensioning for dot-and dash levers, while gap/travel of each arm can be set to preference via contact screws with lock nuts. As an extra feature, your call is engraved atop the yoke's rear plate.

CIRCLE 56 ON READER SERVICE CARD



Computerized Radio Monitoring

A growing number of shortwave listeners and scanner radio monitors are marrying their radios and computers and, in so doing, entering a new era in radio monitoring efficiency—tuning, searching, scanning, logging, analyzing, decoding, even doing remote monitoring, right from the computer keyboard.

Computerized Radio Monitoring by Todd D. Dokey, details the ins and outs of this new and exciting world, discussing many of today's high-end radio software programs. The author looks at today's computer-friendly shortwave and scanner radios and terminal units and explains how to set up your computerized shack, develop computerized monitoring strategies, plan databases and the collection and use of information. Also included are technical notes, how to deal with noise problems and an extensive glossary of computer and radio terms. The book does assume that the reader has some knowledge of computers.

From scanning frequency lists into a database to decoding RTTY and fax, to getting results from your data, *Computerized Radio Monitoring* covers every aspect of the "auto-magic" world of computer and radio working as one.

Published by Tiare Publications, this book is approximately 140 pages, comb bound, and illustrated.

CIRCLE 57 ON READER SERVICE CARD

PC Packet Station

PKT Electronics introduces the PC Packet Station, a complete packet radio station containing the software, modem and 5-watt, 2-channel, VHF, Motorola transceiver on a IBM PC half card. This is a "plug and play" packet for the IBM PC or compatible. The PC Packet station is designed especially for the non technical ham who wants to get on packet radio, but does not want to deal with a soldering iron or cables.

The PC packet station has the VHF antenna connector, earphone jack, squelch adjust and receive level adjust on its IBM PC bracket. As the radio is on the card and everything is pre-adjusted, you just plug the card in, load the customized BayCom software, enter your Amateur Radio call into the configuration file and add a VHF antenna (not provided). The PC Packet station can also be used in any IBM PC (or compatible) portable that has a standard half slot available.

Engineers have been successful in solving interference problems related to PC RF emissions and radio, by using a number of RF design techniques, while designing this product.

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CIRCLE 9 ON READER SERVICE CARD

OPINION

S.O.S. CW

By Ted Herrman, AE8G

After a four year absence, I recently returned to the HF CW bands. With my trusty old Ten Tec Triton, a new G5RV, and a new Florida QTH, I was ready for some serious ragchewing. I blasted out with a couple of short CQs on 7040KHz as I have done for 38 years, and to my surprise, no one came back.

Four years of slow attrition to our ranks had hit me all at once. It seemed as though there were fewer of us. I discussed my observation in a dozen ragchews around the country and became convinced — **THE CW BANDS ARE DYING!**

I suspected that this trend had been brewing for a long time and decided to take an informal survey of CW users on the HF bands. The summarized results appear at the end of this article and confirmed my suspicions. The number of CW operators around has declined because there are not enough young Hams joining the CW ranks to replace silent keys.

I strongly believe that we can reverse this trend. This article advocates the use of two technological advances which exist but are little used today. If you agree and make some changes, things won't be the same as they were before, but CW will persist perhaps flourish. I strongly urge you to consider one or both for your own use.

First, use a Morse keyboard to send code. A keyboard can help existing CW operators to send better code. Better code means more understanding, more fun, more ragchewing, and more CW QSOs. I know many of you can't type — read on!

Secondly, whether you write it with paper and pencil, type it on a mill, or just sit back and listen — you "copy" CW. Morse code readers can help many new operators copy CW and privately develop some speed. I know at least one local non CW Ham who says he will not get on the CW bands without a screenful of computer readout to back up his own ears. I think he'll make a fine CW operator.

An early question when two experienced amateurs meet is, "How fast can you copy?" No code Techs, Novices, and casual CW operators usually come out short in this silly little status game. Many hams avoid losing this game by stating their dislike of CW. In effect they refuse to admit defeat in a game they have consciously chosen not to play. However, to keep facts consistent with their statements, they really do purposely avoid CW. And there you have it —another potential CW op lost.

If my no code friend uses a computer to copy CW, someday he may be able to answer the CW copy speed question with a bigger number. This is our greatest hope for rescuing the CW sub-bands. However, as we shall see, there are several reasons why keyboards and code readers are not in widespread use today. They boil down to two: Tradition and Taboo.

I tell Novices to use a straight key (SK) for their first and second QSOs. After that, **NEVER USE A STRAIGHT KEY**. I can't think of anything that discourages new CW ops more. Most people's arms get tired after twenty minutes. Perhaps a few contacts with a bug and a few more with an electronic key (EK) would be appropriate. That's enough tradition. *All subsequent contacts should be from a keyboard (KB).*

A bug is light years better than a straight key. I learned how to send on a Vibroplex bug in 1954. I used it for years. After that, I put together, loved, and wore out a Heathkit electronic keyer. While building speed one day, it dawned on me: I could understand more and copy faster CW when the other operator used a keyboard.

If you're still using a Straight Key, a bug, or an Electronic Key, do any of the following reasons apply to you? That's how I've been doing it for years. I can't type. I don't like computers. The thought of using a KB (Keyboard) or computer seems like cheating. If any of these reasons apply to you, let's examine them a little closer.

That's how I've been doing it for years.

The old way is Marconi's way. He also used sparkgap. That is not what we do today. It's about time we put Marconi's way of making code on the shelf along with his sparkgap transmitter.

Are you crystal controlled? Do you use AM phone? Would you limit yourself to a 1KHz wide audio filter when you could also afford a 500 hertz filter? Will your next rig be all tubes? These are examples of old technology. Using a bug or electronic key is using old technology. Old technology has brought CW to the brink of extinction. CW is the tradition we should want to save, not old keys.

I acknowledge there are some CW operators who can send good code with a keyer at 40 wpm. To them I say, if you can move your fingers fast enough to do 40, then you can do much, much, better on a keyboard.

Most new amateurs with any phone privileges reach for their microphone rather than master the code. Some new codeless Techs who get on the air without learning Morse code speak disdainfully of CW. If the magic of CW has not struck them, then we need to look within. We must make the music we love, more appealing, more alluring to them.

Technicians and Novices are our best bet for finding new CW ops. Not only are they interested in communications, they're already licensed. Lets make their job easier by encouraging them to use modern equipment.

In a larger sense, there is no difference between sending and receiving. Both occur simultaneously. Only the role of the individuals concerned reverses periodically. Both senders intend for every character sent to be understood. Both persons copying want to understand every character. You maximize your own understanding by purchasing the best receiving technology you can afford. You maximize the other's understanding by sending perfect code.

Lets take a look at the role of the sender. His goal is to produce perfectly formed letters, perfectly spaced. Errors occur with traditional technology. They don't, with keyboards. Of course one can make typing mistakes. However, as we shall see, you can TOTALLY eliminate these.

There are five errors one can make sending CW. They break down into either poorly formed letters or spacing problems. They are:
1) Dash is less than 3 times as long as a dot. Dashes twice as long are difficult copy. Less than two to one is impossible to copy.
2) Wrong number of dots or dashes to construct a letter. Send "6" for "b".
3) Too little space within or between letters. Send "c" for "t r.
4) Too much space within or between letters. Send "t r" for "c".
5)Finally, too little space between words.

There is an electronic computer "pipe" (called the sending buffer) into one end of which you type characters. It can hold from 0 to hundreds of characters. It takes a while for characters to make their way through the pipe. To make use of the pipe, you simply adjust your transmit speed to just "under" your typing speed. The text you type accumulates in the buffer because you are typing it in faster than the transmitter is emptying it. The transmitter only sends the character seen at the far end of the pipe.

You can correct typing errors while they are still in the pipe. Of course, when all errors have been corrected, you can resume putting more text into it. You can do all this while the transmitter is sending automatically. No changes of any kind are required in your transmitter. With an hour's practice you will become an expert at switching back and forth between correcting and adding text.

I can't type.

This is the single biggest bugaboo older ops have. For many it's not that they can't, it's that they don't want to. I understand. I hate to do situps, but I force myself. If I don't, I look like a blimp. Unless CW operators force themselves to change to a keyboard, the current downward trend in the number of CW ops will continue. Soon, the number of CW ops will equal the number of AM phone users. (And that's how much CW band space we'll get, too!)

There are thousands of packet operators who can't type but it doesn't stop them. Use two fingers and hunt and peck if you have to. Force yourself.

Even if you use only 2 fingers on a keyboard, you can easily send 20 words per minute. I tested non-typers on a keyboard for speed. On their first try, 71% of those tested typed error free code at 20 wpm or more while 58% typed error free code at 25 wpm.

With 15 minutes of practice, the 20 wpm group improved to 35 wpm and the 25 wpm group improved to 42 wpm.

Haven't typed in years? Don't worry! You'll be surprised at how quickly it comes back. Typing 35 wpm is slow, copying 35 wpm is fast. It's the old bicycle riding cliche. Once you learn how to ride you never forget.

There are two inescapable facts. A single finger movement on a keyboard produces a perfectly formed character. Many finger or hand movements are required on a non keyboard device, with no guarantee of a perfect character. **So, it's disproven that non-typers can't use a keyboard. It's not true and you shouldn't let it stop you!**

Ever get that paranoid feeling? Why doesn't someone answer my CQ? Maybe the errors you made in the CQ "turned off" the guy at the other end? He wonders how difficult it will be to talk with you, if you can't send an errorless CQ.

Keyboards have special message buffers. These are different from the sending buffer. You type text into these too, but it does NOT get sent out. You edit it to perfection. Then it waits for your order. When you want to send CQ, just push a button and out comes a perfect CQ. Problem solved!

Some of us are getting a little shaky due to age or when we are very tired. It's difficult to be precise on a straight key or bug. We know that our dashes are sometimes less than three times as long as a dot. For those same ops who use a bug or electronic keyer; we know it's difficult to send the correct number of dots in our "b"s, and "6"s at high speed. A keyboard is the answer. Since "b" and "6" are far apart on the keyboard, no one will ever hear you make that mistake again.

I've had QSOs with older ops who cut it short because they knew their fist is not what it used to be and copy was "challenging" for me. There have even been occasions where I cut it short because the copy was just too tough. How nice it would be for those fellows

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if they could send as well as they once did. How nice it would be for them to pound brass today for as long as they liked knowing that their fist is now BETTER than it was 40 years ago.

I don't like computers.

Many people don't. I don't like NOISE! But I put up with it so I can enjoy 80 meters. Like it or not, computers are here to stay. Unless you put up with them, CW as we know it, is going to continue to wither.

Don't think computer, think tool. It is a tool that you use to make Morse code. You don't have to learn any programming. You don't have to become computer literate. You don't have to know how it works. I don't understand how the automatic transmission works in my car. My ignorance certainly doesn't stop me from using it to get around.

My first keyboard was a Commodore VIC 20 home microcomputer with a BASIC program someone wrote that allowed me to send up to 20 wpm. CW was never the same after that. I ragchewed more — really got to know the other guy.

Now, I use an IBM AT clone with a software package written by Dave Freese, W1HKJ, (29 N Ravenwood Drive, Cape May Court House, NJ 08210). I got his ready to go software (Shareware) for $5.00 at the Miami Hamfest in February 1992. I have no idea how he wrote it or what makes it work. I can easily adjust the weighting ratios to make it sound like a bug. Many operators compliment me on the quality of my bug sending.

Using a keyboard or computer seems like cheating.

We already use computers for Packet, RTTY, Amtor, and ASCII. Why not CW? The way I see it, cheating is any activity widely judged illegal, immoral, unprofessional, or unproductive. Computers are certainly legal. They are tools possessing no morals of their own. They are widely used in professional CW today (armed services, commercial and merchant marine circuits). They certainly increase speed and understanding, as well as productivity. So, none of the cheating criteria apply.

Some operators I have talked to, would define cheating as non-traditional. I agree completely. Using a computer is not a traditional way to make and copy code. Let's forget tradition except on Straight Key Night (New Years Eve). Let's save our mode. Sam Morse used the best technology he could. Let's do the same! **It is now socially acceptable for a computer to read Morse Code!**

Packet users are lucky. You probably already have the software you need for both sending and receiving. Every advertisement I have seen recently includes software for Morse Code. You certainly already have the screen and keyboard. So you are all set. No waiting, no boredom. There is always somebody somewhere on CW.

I much prefer QSOs with someone using a computer to copy me. I can then send as fast as I like and I can ask the other operator to increase his sending speed to my upper receive limit. I can send all the unusual words I like and I know they will be understood. I have very few stereotyped conversations. So much more can be said besides RST, QTH, name, rig, ant, and WX.

Some experienced CW ops who copy it in their head argue that having a screen display available is too great a temptation. They fear that they would look up to see if the computer correctly copied a bit of text that was unclear to them. They say that this would become habit forming. They say that slow ops and beginners will become display dependent and never learn to copy in their heads.

Maybe so... it's better than watching the mode disappear altogether. Anyhow, maybe not... there will always be some who accept the intellectual challenge to copy it in their head. Whichever happens, I want there to be plenty of CW stations around 30 years from now when hopefully I am still taking it in my head. Anyway, if you don't want to use the display, simply don't hook up the audio line from your transceiver to your computer.

If your CW ability is slow or gone altogether get a computer to help you copy. Use the keyboard to send. There are inexpensive computers available at every hamfest. If you are like most keyboard users I talk to, you'll love it. Once you make the transition, you'll regret that you didn't do it sooner.

If you already have a home computer, for a negligible sum you can make it into a keyboard and a Morse code reader. If your computer is PC compatible and you send me a 5 X 8 padded self-addressed envelope with sufficient return postage, and a 3.5" diskette, (high density, not double density) I'll send you a FREE copy of Dave Freese's (W1HKJ) program. (I sent him a voluntary donation because he has written a darn good Morse Code Keyboard Program). 73 es GL.

Statistical Survey

For two weeks I gathered statistics on nearly every non-DX CW QSO I had.

All bands 80 thru 15 were used. I avoided the Extra Class sub-bands but purposely included the Novice sub-bands. Most DX chasers I called, took the time to talk to me — a few did not. I had contacts as early as 6:45 AM and as late as 11:45 PM. I spent about the same number of hours per day on the air weekdays as I did weekends. I contacted stations who sent as slow as 4 wpm (his 3d QSO) and as fast as 45 wpm. The sample size was 52 men and 2 women.

Some conclusions from the statistics

1. The average age of a CW operator is 61.
2. Only 9% are less than 40 years old. Only 1 is a teenager.
3. Half are greater than 65 years old.
4 There are approximately the same number of operators less than 40 as there are older than 84.
5. Two thirds use CW at least 90% of the time. Many of these stated that they only used SSB to QSO special ham buddies who would not or could not use CW. Except for these contacts, they would use CW 100% of the time.
6. The average CW operator has been licensed over 27 years.
7. Only 10 operators (18%) had from 2 thru 20 years of experience.
8. Only 9 operators (17%) had less than 2 years experience. Of these there were 5 Novices, 2 Tech Pluses, 1 General, and 1 Extra class. ■

Ted Herrman, was licensed as a Novice in 1954 in the Panama Canal as KZ5VV, has been a CW operator nearly all his life. In the 1970s, he began teaching Novice code and theory and gave amateur radio exams in the Canal Zone. He recently retired from the Federal Service near Washington DC. Ted now lives in Florida and is active today on CW as AE8G. You may QSL to: Ted Herrman, AE8G, 2827 Finch Dr., Holiday, Florida 34690.

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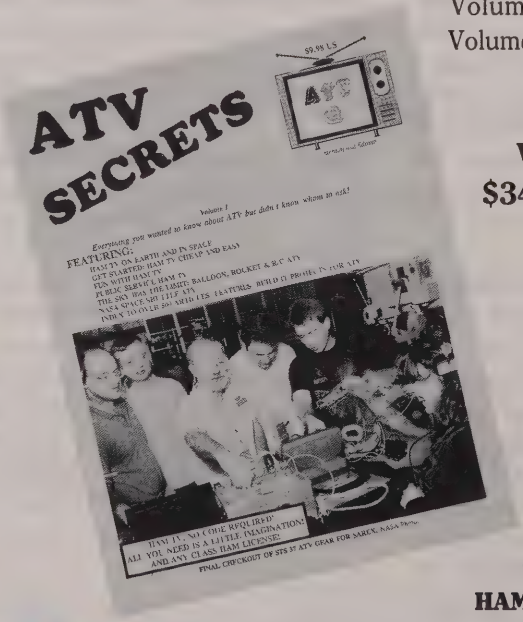
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Fairs Members Planning Project in Bangladesh

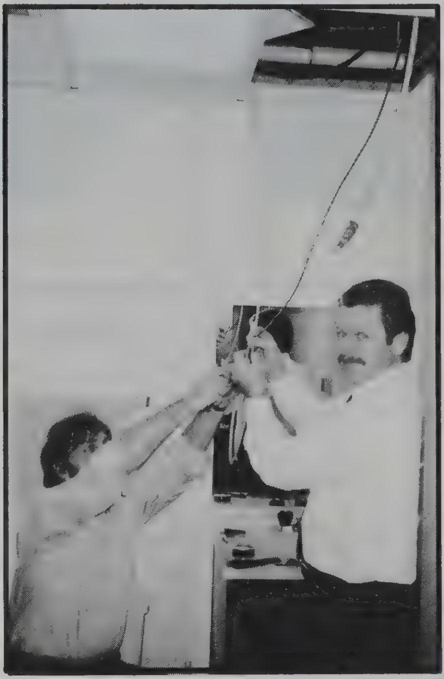
(Continued from page 31)

Returning in December we had everything needed as well as an HF amateur transceiver to test the antenna. Gordon Garrett (KC4DY) joined us for our work crew at the embassy. When we entered the embassy with all our cables, HF transceiver and tools, the receptionist, in traditional Bangladesh attire, said "You must be the wireless guys" and gave us the go ahead to proceed to the radio room and do any work needed.

It only required several hours to splice the additional cables and pass them about 100 feet along the false ceiling between the ambassador's bathroom and the radio room. Victor and Gordon did all the work in the ambassador's bathroom while I placed the cables in the false ceiling between the bathroom and the radio room.

I attached my HF transceiver to the new cables leading to the Log Periodic on the roof and found the SWR was excellent. Then a quick CQ contact was made with a ZS6 station, and reports were excellent both ways. Some time was spent on the sophisticated HF embassy equipment. It worked fine "at this writing" but a little more time is needed to check it out completely.

A big reason amateur radio has moved very slowly in Bangladesh is that the government doesn't give amateur exams or issue licenses to their citizens. We hope to see a change after the IARU administrative training program for officials of the Telephone and Telecommunications (T and T) Board in Dhaka. Dr. Ali and I met with Larry Price W4RA, Secretary of the IARU and Paul Rinaldo W4RI, Manager of Technical Relations for ARRL, in late summer of 1992 to discuss the amateur situation in Bangladesh. The *Bangladesh Amateur Radio League* had requested his training but no plans had been made.



Connecting coax in Ambassador's bathroom. Victor Goncharsky (left) using the Ambassador's toilet as a resting place while splicing coax and rotator cable. Gorden Garrett (Right) preparing cable for soldering . This Job required white shirt and tie.

The FA!RS group has been in Dhaka during the first two weeks of March to train several dozen Bangladeshes to be amateurs as well as to install an **HF** Aplink and other amateur equipment for the New emergency network. The FAIRS group working in Dhaka consists of KK4WW, KD4GMV, N4VA, UB5WE, RB5WA, UA4LCQ and UA4LLQ. We plan to have two HF stations operating continously for about 10 days.

We have optimism that our amateur training and DXpedition will be a complete success. All arrangements in Dhaka have been made by Mr. Taimur Rahman, Director of Bangladesh operations for FAIRS. The Bangladesh Embassy in Washington and the US Embassy in Dhaka are committed to this amateur radio project and have helped in many ways with our arrangements and amateur operating licenses.

It'll be very interesting to see the group assemble in Dhaka from Russia, Ukraine, USA and Taiwan (N4VA FAIRS member is in Taiwan and will come direct from there).

David Larsen is executive director of FAIRS and has been a faculty member at Virginia Polytechnic Institute and State University for 25 years. He holds the following licenses: KK4WW, UB5WUS, and UA4LWW. Gaynell Larsen is vice-director of FAIRS and has a career in private business. She holds the following licenses: KD4GMV, UB5WMV and UA4LMV. For more information on the Foundation for Amateur International Radio Service, write to FAIRS, P. O. Box 341, Floyd, VA 24091. ■

For more information on the Foundation for Amateur International Radio Service, write to FAIRS, P.O. Box 341, VA 24091.

A Simple Multiband Vertical

(Continued from page 10)

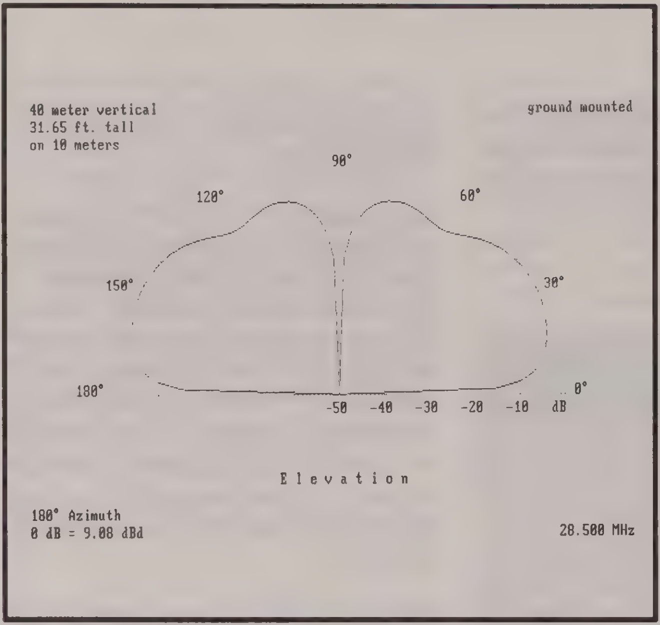


Figure 5

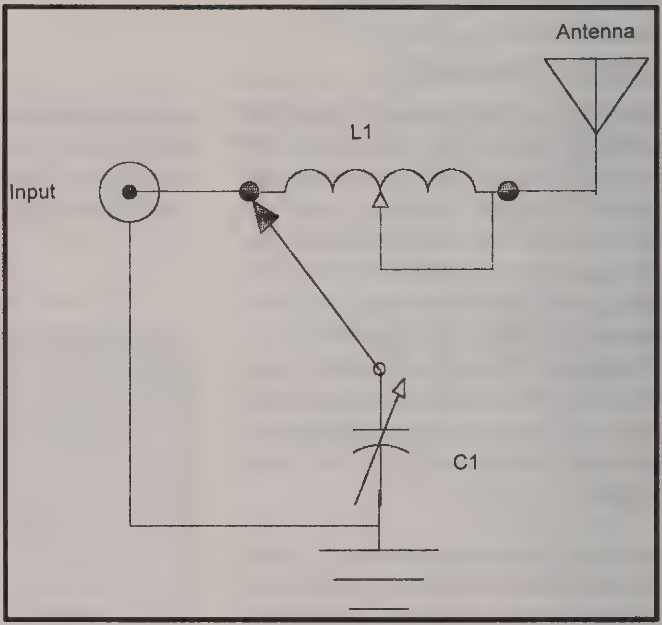


Figure 6: L Network For Antenna Matching

angles of radiation at the higher frequencies are useless, since there's no ground wave.

10 Meters

Finally, we have 10 meters. Now this antenna is one wavelength long on 10 meters and since it's one wavelength tall there are two current nodes that are above ground. There will be some phase cancellation and this will contribute to the angle of radiation being at 34 degrees. You'll get enough signal at the lower angles between 34 and 10 degrees to work some DX.

General Comments on Verticals

This vertical antenna project came about as a result of a discussion with several Hams who live in an *antenna*less environment, and were looking for a way to get on the air. We started with the 40 meter verticals, after all the discussion had ended, the patterns and design that came out of this are presented here. If you do not want to operate on 40 meters, delete the radials and the radiation angles will drop. I am not going to speculate as to why, as I've always been told that the radials would lower the angle of radiation, but only with a 1/4 wave vertical it seems.

The 1/2 wave antenna is totally ground independent, as is the 1 wave vertical. I 'll say that if you can't put out radials, this antenna will work on 40 meters with fairly good results. I used one like that on 40 meters when I had my Novice license in the 50s. It didn't do too bad for a cheap antenna with a 25 watt Heath AT-1 transmitter. I never tried it on 15, as I had a dipole made out of AC power cord and fed with power cord. SWR? What was that? In those days I didn't know nor cared about it.

In case you have no other alternative antenna and it's a choice of getting on the air or not, using a 32 ft. vertical can be the solution. I know that often finances can determine the antenna that we put up, and I try to keep my antenna projects as inexpensive as possible. By using 3 inch galvanized downspout I was able to put up a 3 tower phased vertical, at a cost of $20 per antenna. The switching system was what bothered me. So check out your possibilities and make the most of what you have.

Matching Network

The matching network can be an "L" network. This will take care of what you'll need to do in the matching and tuning department. What you see in Figure 6 will do the job. It's a reversible network and this allows it to match both high and low impedance antennas. This is also a good circuit to use for other antenna projects. I haven't put any part's values on the diagram since what you need will depend on what you finally decide to put up for your antenna. ■

HAM BRIEFS

By Bob Scupp, WB5YYX
648 Marquis Dr. NE
Albuquerque, NM 87123-1429

FCC Acts On ARRL Petition Providing Amateur Access To 219-22 MHz! Fixed Station Point-To-Point Communications Proposed

The FCC has issued a March 5, 1993 news release proposing that amateurs have access on a secondary non-interference basis to 219-220 MHz for amateur auxiliary station, (point-to-point) packet networks and other point-to-point fixed communications. The Commission, acting on an ARRL Petition for Rulemaking, will build certain safeguards, such as operating limits and other means to ensure protection to primary operations within the same band segment.

The American Radio Relay League's Petition for Rulemaking had asked for amateur access to 216-220 MHz to compensate for the loss of 220-222 MHz. ARRL stated that certain geographic areas were congested and spectrum relief was a necessity. The Commission agreed with ARRL that the 222-225 MHz band is congested and some form of relief is necessary. The FCC invited comments on operating parameters that should be performed.

A notice of proposed rulemaking or NPRM usually has a 60-90 day comment period, and a 30 day period for reply comments. At my dateline, FCC has not released the full text of ET Docket 93-40, nor are comments and reply comments dateline available. More to follow in May *Hambriefs*.

More About Spectrum Auction And Congressional Action

Both Houses of the United States Congress are now considering their versions of a "bill" proposing to reallocate 200 MHz of Government spectrum into the private sector. The Senate version, S 335 contains protection of amateur/Government shared spectrum above 225 MHz. House bill HR 707 was put on a fast-track action, and, while not containing similar Amateur protection, was also being monitored by ARRL's Washington Team.

League President George Wilson W40YI directed the Washington Team to "pull out all the stops" to get Amateur protection in HR 707. Representative Kreidler, Democrat from the State of Washington addressed the House floor on March 2, 1993 on this bill. He detailed the long history of Amateur Radio's role in providing emergency communications, especially in his own state. Kreidler expressed his sincere intent to work closely with the Senate to protect Amateurs from "...further erosion of their spectrum availability". Representative Markey, Democrat from Massachusetts and Chairman of the *House Telecommunications and Finance Committee*, pledged his cooperation and support. He made the following statement: "... the gentleman from Washington (Rep. Kreidler) raises a very important point. We intend to work with the gentleman. Ham operators are an important part of the fabric of the telecommunications network of the country and as we move forward we will continue to take into account the very real concerns raised by the gentlemen on the floor this afternoon." He added.

FCC Commissioner James Quello Appointed Interim FCC Chairman

Former FCC Chairman Alfred Sikes resigned January 19, 1993 and the Clinton Administration moved into Capital Hill the next day. Until a permanent FCC Chairman can be appointed, President Clinton has named 19 year FCC Commissioner James Quello as chairman. Quello, as FCC Commissioner, was first appointed by President Nixon in l974, reappointed twice by President Reagan and then by President Bush, has outlasted every member of the Commission. Other current FCC Commissioners include Andrew Barrett, whose term expires in 1995, Ervin Duggan, whose term ends next year, and Sherrie Marshall, whose term of office expires in June, 1993. Marshall has reportedly begun job hunting even though continuing to serve until the Clinton Administration decides whether to reappoint or replace her. She has been avoiding voting on matters that could affect future employment opportunities. The President can appoint up to five FCC Commissioners subject to Senate confirmation. No more than three FCC Commissioners can be affiliated with the same political party. Their term of office is five years and besides making wide ranging telecommunications decisions, they manage over 1,700 employees.

Great Britain Gets Novice Enhancement

The United Kingdom Department of Trade and Industry has announced that effective February 1, 1993, Novice Class "A" and "B" licensees will enjoy expanded frequency privileges. This is being done to additionally encourage young people into radio and electronics as radio amateurs and professional careers. The Novice Class "B" license requires an applicant to successfully complete a 45 question written exam which is administered at the City and Guilds Centres. The Novice Class "A" license requires an applicant to also successfully complete a 5 wpm code exam. New spectrum available to the "A" licensees are 3.560-3565 MHz and 28.060-28.100 MHz. Both "A" and "B" class licensees can also now utilize 50.0-52.0 MHz (formerly 51.250-51.750 MHz) and 432.0-440.0 MHz (formerly 432.0-434.0 MHz). All candidates for a UK Novice Class license are required to complete a formal 30 hour training program and pay an exam fee.

FCC Issues Report And Order On Commercial Radio Exam Program Privatizes Exam Process And Rewrites Part 13 Of Its Rules

The Federal Communications Commission has taken the final step in completely privatizing the commercial operator examination process. In its Report and Order on PR Docket 92-206, the Commission specifically detailed the operations of the new program in the 31 page document which was issued on February 12, 1993. The system will pattern itself after the tremendously successful Amateur VEC program in effect since December 1, 1983, now approaching its tenth anniversary. A *COLEM* or Commercial Operator Licensing Manager will operate much like that of its Amateur counterpart volunteer Examiner Coordinator or VEC. Two FCC issued Public Notices will announce a filing window for those groups and organizations wanting to become a COLEM. Those COLEMs wishing to serve a wide geographic area will receive preference over those wishing to serve small areas. The second FCC Public Notice will address the handling of commercial operator license exam question pools.

The FCC established this rulemaking last August, but has actually been probing for public interest and support of privatizing the Commercial exam process since 1986. The Clinton administration's plans for more budget cuts and inability to provide more exam opportunities, are two important reasons for the privatization process.

STS-55 Delayed

The next flight of Space Shuttle *Columbia,* STS-55, which will also carry *SAREX* or Shuttle Amateur Radio **EX**periment, has been postponed until Saturday, March 13, 1993. ***NASA*** decided to delay the launch until it can inspect the retainer seals in the HPOTP or High Pressure Oxidizer Turbo Pump on the Space Shuttle Main Engines or SSME. This will also delay the timetable for the launch of STS-56 and STS-57. Astronaut Charles Precourt recently received his license as KB5YS2 and will fly with Commander Steve Nagel, N5RAW and Jerry Ross, N5SCW. Other crew members of STS-55 will be two German Payload Specialists Hans Schlegel, DGIKIH and Ulich Walter, DGIKM.

Both STS-55 and STS-56 are Shuttle flights carrying SAREX on board. The latest Astronaut to join the amateur ranks is Steve Oswald, KB5YSR who will be joined by veteran Ken Cameron, KB5AWP, Ken Cockerell, KB5UAH, Ellen Ochoa, KB5TZZ and Mike Foale, KB5UAC on the STS-56 mission.

There's no further word on both STS-55 and STS -56 at my deadline. Watch May *Ham Briefs* for an update.

Florida Judge Orders Hams To Remove Tower Antennas, Forbids Further Amateur Operations Pending Appeal

Judge Charles E. Smith of the 19th Judicial Circuit in Indian River County Florida, has made what may be a precedent setting decision in a case involving Amateur towers, antennas and Amateur operations. David and Sharon Brower, WA4NST and N4XLF, of Vero Beach, Florida have been fighting a two year legal battle to keep their 68 foot tower and amateur antennas. While deed restrictions say nothing about this matter, Judge Smith ruled the amateur operations as a "noxious and offensive activity". Smith also ruled the tower and antenna an "eyesore" that exceeds the two story building limitations in the deed restrictions of the subdivision.

If this Ham family is unsuccessful in their appeal, a very dangerous precedent may be set for any neighbor to accuse a Ham of interference to home entertainment devices, and to get a final judgement from a court judge to have the Ham remove the tower and antennas and cease all amateur operations.

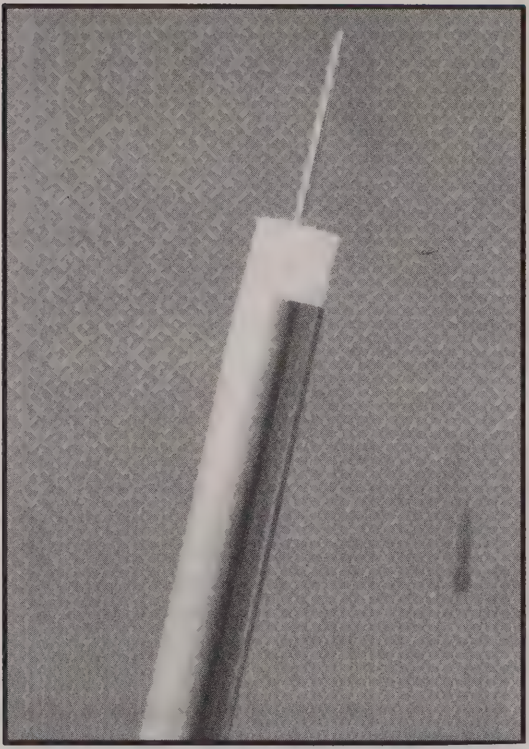
VHF Activity Report

After speaking to Jack, N2DXP of NJ on Sunday, March 7, 1993, I found that he had no Sporadic "E"or "F" layer contacts on 6 meters since March Ham Briefs. Apparently, six was opening on occasion to local contacts not exceeding 200 miles or so. Jack said he was hoping for a better report when the regular Sporadic E season opens in May. Meanwhile, what's happening on the **VHF** bands in your area? Send your reports to me and let me know. ■

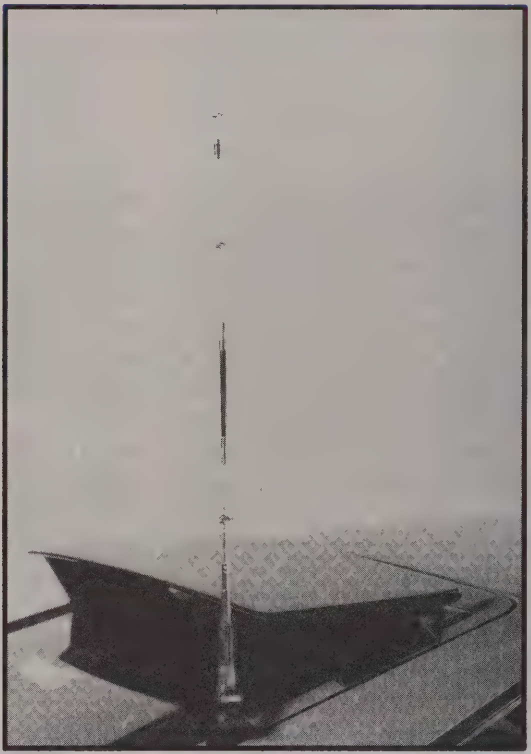
For ***Ham Briefs***, this is Bob Scupp, WB5YYX wishing that all your news is good news' Until next month, 73 from your Amateur Communications news center. All contributions are encouraged and welcomed!

Pump Up Your Two-Way Power With A Collinear

(Continued from page 8)



Brass rods are used in the commercial-rated Comet, Diamond, and Valor collinear antennas.



The open coil on the mobile elements separate the collinear phased sections for dual-band and tri-band operation.

series of "Spirit" antennas. Featuring a phased halfwave series of collinear elements to produce a precise radiation angle over a very wide band width. Their 1-3/4" diameter white extruded fiberglass radome is combined with a 2" long heavy-walled aluminum base.

The Hustler amateur radio 440 MHz system offers 9 dBd gain. Their 2-meter series offers up to 6 dBd gain. A new 222 MHz series offers up to 6 dBd gain. A 12 dBd 900 MHz antenna as well as a 12 dBd 1.2 GHz antenna was just added.

We tested a pair of Hustler 1.2 GHz antennas on our Southern California coordinated 1282.400 MHz repeater. The performance difference over the other "amateur type" lightweight antennas was at least 3 dB improvement on sending and receiving signal strengths. Major improvement on mechanical construction is necessary for an antenna system high atop a tower, that you just do not want to service on a regular basis. We could also pick up 3 dB of additional gain by adding a reflector for an offset radiation pattern spaced 1/4 wavelength away from the encapsulated antenna elements.

If you need additional omnidirectional coverage, indeed consider a collinear array for single-band, dual-band, or tri-band use. If it is for your home or car, the lightweight and inexpensive collinear arrays available at ham radio stores are a terrific way to get started with increasing your gain. However, if you are seriously considering a tower-mounted antenna, you may wish to call a commercial land mobile radio dealer and explore pricing of bigger and heavier antennas, or call Newtronics Antenna Corporation (817/325-1386) for the technical specifications on their new "Spirit" series antennas.

Their new heavyweight line of antennas really make a difference on the VHF and UHF bands for omnidirectional coverage. ■

Multi-Cultural Projects

By Carole Perry, WB2MGP
P.O. Box 131646
Staten Island, NY 10313-0006

After four weeks into the Spring term with my new Ham radio classes, many of the students seemed especially fascinated with the idea of being able to speak with people from different countries. I usually get about 400 youngsters in my 13 classes; and each year there is a different "chemistry" to the classes. There have been times when most of the children gravitated to VHF and UHF exclusively; and other times when they only wanted to get involved with ATV, packet or CW.

This term the 6th, 7th and 8th graders were eager to get started with different "DX" projects. Several of my former students who still attend Intermediate School 72 in Staten Island, New York brought in QSL cards from contacts they had made on their own 10 meter rigs at home. The children always enjoy listening to their peers speak about what fun they're having, and the licensed students enjoy sharing their "expertise" with the other kids.

One afternoon when we had several boxes of QSL cards to go through, we decided to organize them by country and to assign teams to each country who would report back to us with more information. Before I knew it we were involved with the ESL (English as a second language) teacher and with the foreign language department

A large Patchwork paper guilt was constructed to reflect "Squares" representing different places we contacted

Children enjoy learning what they have in common with others all over the World

fair. Parents were sending in dishes of foods from their native countries along with samples of clothing and other articles indigenous to that area of the world.

One of the nicest projects the children came up with was a multi-cultural quilt made of construction paper. Every time a radio contact was made with a different region of the United States or with a foreign country, a child would make a square patch with tempera paints to include a scene or symbol of that area. When the patchwork "quilt" was completed, we were so delighted with it that we left it hung up in the auditorium for visitors to see as well.

A fun toy that one of the teams made when they presented their reports on Mexico was the Bolero toy. Several of my students received personal family photos from the *hams* they had spoken to. This personal touch led them to research things of interest to young people in that country. The Bolero Toy was a big hit in class. The game itself requires simple hand-eye coordination. The materials needed to make it are: a toilet tissue cardboard or paper towel tube cut in half, 18" long piece of wool, an empty thread spool, tempera paints and brush, and a hole puncher.

First the kids painted the tube in bright colors and designs, and let it dry. Next the wooden spools were painted and let to dry. A hole was punched in the paper tube near the top. The student then ties one end of the wool to the tube and the other end through the spool. The object of the game is to get the spool into the tube while holding the tube in one hand. Needless to say, we all had a good time with this one. Later on, the toys were packaged and brought over to a local community center where they were distributed to appropriate children's organizations.

When the kids in my classes speak with other children or any other ham anywhere outside of our area they like to find out all the things that are different about them. They are also starting to appreciate the fact that all people really have lots in common with each other; especially things that appeal to children. Most students; wherever they are from, are concerned about report cards, grades and tests. It's an enlightening experience listening to children talking to youngsters from other places and sharing so many of the same concerns and fears about the world today. As adults, maybe we ought to start listening more to what the young people are saying. ■

DX News Around The World

By Raul Gerstel, DK3KC

A3 - Tonga
Charles, A35CT, is QRV on 14.219 around 06:30. He'll stay 2 years in Tonga.

A5 - Bhutan
Jim, VK9NS, tells us in a letter, we can count on a permit for Ham operation, within the next 6 months.

A7 - Qatar
SP5EXA is now QRV with the indicator A71CW. His activities have increased considerably. QSL to Box 22101, Doha, Qatar.

CE9 - Antarctic
Justo, CE90H, is QRV till the end of the year from the Bernardo O' Higgins Base. Generally you can find him on Sundays on 14.190 at 20:00.

CN - Morocco
Patrice, CN8HC, works at the French Embassy in Rabat. You may find him on weekends, generally on 15 meters SSB.

D2 - Angola
Despite political disturbances in this country, we continue to register amateur activity. Since mid November D2SA (ex TT8SA) has been QRV. D2/N6QHO is QRV on Sundays from 15:00 on, between 28.640 and 28.500. He is on high frequency bands on weekdays starting at 18:00.

ET - Ethiopia
Contact was made with Rudi, DK7PE, he's working from the station at the *Ethiopian Amateur Radio Society Club*, ET3AA. You can still count on more activities after 17 years of prohibition.

FO - French Polynesia
Eddie, FO4OK, has been active almost every day on 10 and 15 meters from Tahiti. Activities on 10 meters begin around 21:00 and on 15 meters, around 22:00. He has been heard also on 14.175, at 09:15.

J5 - Guinea-Bissau
J5UAI, has been very active on 20 meters SSB, around 14.205 at 16:30. He'll stay in this country until June 1994. QSL via NW8F.

JT - Mongolia
Naran, JT1BV, has been greatly active on WARC bands. Try to listen to him every day on 10.106 at 13:00, on 18.145 at 01:00 and on 24.940 at 00:00. Naran has asked that any postcard sent to him QSL, to please do so via Japan. Regular correspondence goes via Russia and doesn't go through Mongolia.

JX - Jan Mayen Island
Another very active OM from the island is Per-Einar, JX7DFA. This is his fifth visit there. His activities extend from CW/SSB and RTTY, and go as far as Packet and MEM (Moon Earth Moon). QSL via LA2KD, Box 300,

DX News Around The World

N-1202 Oslo, Norway or LA7DFA, Blommenaasen 12, N-6520 Rensvik, Norway.

KH5/KH5K - Palmyra/Kingman Reef

The team that is already there will be QRV until the fifth of May. The following frequencies are being used: **KH5**: CW - 1.825, 3.525, 7.005, 10.124, 14.045, 18.095, 21.045, 24.915 and 28045 KHz; SSB - 1.825, 3.790, 7.085, 14.155, 18.145, 21.245, 24.965 and 28395. **KH5K:** CW - 1.835, 3.525, 7.020, 10.104, 14.020, 18.070, 21.020, 24.895, 28.020; SSB - 1.835, 7.075, 14.195, 18.115, 21.295, 24.935, and 28.495.

S9 - Sao Tome & Principe

There has been great activity from here, thanks to Chas (S92SS) and Leslie (S92YL). You can generally find Leslie on the DX net, on 14.226, beginning at 21:00. Chas has been on 10 meters SSB, around 21:00. He has also been heard on 18.072 at 23:00.

T5 - Somalia

KF6BL/T5 is present almost every day around 23:00. Usually he alternates between SSB and RTTY from one day to the next. Listen on 14.195 or 14.085. QSL via KZ6X.

TJ - Cameroon

You may find TJ1JR every now and then on 15 meters between 21.265 and 21.275, starting around 16:00 till 21:00.

TN - Congo

Andre, TN1AT is generally on the DX net. Catch him on the only active station from Congo. Listen on 21.275 around 11:00 or on 14.256 around 17:30. QSL via F6FNU.

TZ - Mali

TZ6RM, leaves the country at the end of April en-route to her QTH (Colorado).

VP8

The actual known active stations are (according to WD9GGY):
VP8CDJ South Georgia; VP8CDK Falklands
VP8CFM South Orkney; VP8CGK South Georgia
VP8CKB South Georgia; VP8CKC South Orkney
VP8CLR South Georgia; VP8GAV Antarctica
VP8SGB South Georgia; VP8VN Falklands

XT - Burkina Faso

Peter, XT2BW, can be found sometimes on 20 meters, operating RTTY between 20:30 and 21:30. QSL via WB2YQH.

ZD8 - Ascension Isle

Des, ZD8DEZ, will remain until the end of August. He prefers the following frequencies: 10.119, 14.019, 14.190, 21.019, 21.190, 28.019, and 28.491 KHz. RTTY/AMTOR on the usual frequencies. Andy, ZD8VJ is on the Isle for one year. QSL via G4ZVJ.

ZL7 - Chatham Isle

The 1993 Dxpedition to Chatham Isle has been set for the period beginning with the first of August all thru the 8th. Activities will come into effect from 10 to 160 m, also from 2 and 6 meters on SSB and CW Frequencies: 3.505, 7.005, 14.025, 21.025 and 28.025; SSB Frequencies: 3.795, 7.085, 14.195, 21.295, 28.495 (split if necessary). QSL via ZL2AL, P.O. Box 54, Hastings, New Zealand. Please send SASE. Cards sent through QSL Bureau are also accepted.

5R - Madagascar

George, 5R8DG is also active on WARC bands. He has been heard on 24.495 at 15:00. QSL via F6FNU.

9K - Kuwait

Hams who made contact with stations with the suffix "NL" on their indicator due to the **"National and Liberation Day"** observance, may obtain an award. In order to qualify they should have made two contacts with station 9K2RA-NL and one contact with another 9K2 station. Also having heard the above mentioned stations is considered valid for qualification. All requests for a **"National and Liberation Day Award"** must be submitted along with five IRC's or $3.00 (U.S.) and should be addressed to: The Award Manager, Kuwait Amateur Radio Society, P.O. Box 5240, Safat 13053, Kuwait.

DX News Around The World

Claus, 9G1AP/9N1, is in Katmandu working for a German company. He is waiting to obtain his visitor's license, which should be arriving soon. All QSL's should be sent to: P.O. Box 1114, Katmandu, Nepal

Pirates

9GOX from Ghana, who used to request QSLs via OH2BH, is (as it was expected) a pirate. We still may have to wait a long while for legal stations from Ghana.

QSL Addresses

A71CW Chris Dabrowski, Box 22101, Doha Qatar.
BY1BJ Patrick Lebeaume, B.P. 265, F-67504 Haguenau, France.
C6A/WA1IML via Bill Hassan, P.O. Box 32, Newtonville, MA 02160, U.S.
DU1/DL1VU via DL1VU, Karl H. Hille, Goethestr. 3, W-8172 Lenggries, Germany.
HC8A via WV7Y.
HR - In the past there has been serious difficulties trying to receive a QSL card from our colleagues in Honduras. Now a solution has been crystallized: You may send your QSL to the following address: U.R. E. H.- BUREAU, P.O. BOX 73-73, SAN PEDRO SULA, HONDURAS C.A. The envelope must be sent as "certified" mail. Please enclose SASE and a "green stamp". In case you already sent your QSL with the "green stamp" please contact the following entity: *Union de Radioaficionados Experimentadores de Honduras* (Ham operators and experimenters Union of Honduras) attn.: Jorge Escoto, HR2JAE to the address above.
JD1/JG1RMB via JM1XCW.
HK3JJH via DF4UW
KC6/DL1VU via DK5EX, Gerd Mannheim, Arzbacher Str. 7, W-8172 Lenggries, Germany.
KC6SM via JA6EGL.
KC6VW via JA6BSM.
KH5/DL1VU via DJ9BC, Joerg Richter, Bahnhofstr. 32, W-7261 Althengstett, Germany.
OJO/OH3AW via Box 74, SF-15170 Lahti, Finland.
RU1A via KC1WY, Nathaniel Trumbull, 17 Church St., Woods Hole, MA 02543, U.S.
SO1A and SORSD via EA2JG, Arseli Echeguren Bardeci, Las Vegas 81, 01479 Luyando, Alava, Spain.(the address in the Callbook is incorrect).
T30CT via DL1VU, Karl H. Hille, Goethestr. 3, W-8172 Lenggries, Germany.
T31AF via DL2MDZ, Rainer Kuehnberger, Friedrichstr. 10, W-8662 Helmbrechts, Germany.
T32VU via DJ3TF, Wolfgang W. Wessely, P. O. Box 2211, W-8450 Amberg/Opf. Germany.
T33VU via DL4YAH, Heiko Halfmann, Kolpingstr. 14, W-4358 Haltern, Germany.
TJ1GA via I2WMB.
V33JZ via NN7A, Art Phillips, Box 201, Flagstaff, AZ 86002, U.S.
V31RL via NG7S, Mike Sharp, Box 7, Flagstaff, AZ 86002, U.S.
V63VU via DB5UJ, Guenter Conrad, Sensenschmidtstr. 10, W-8500 Nuremberg, Germany.
VK9LM/DJ5CQ via DJ5CQ, Rudi Mueller, Alter Main 23, W-8601 Ebing, Germany.
VR6JJ and **VR6BH** via JF2KOZ, Main Haitsu 7-3, Room 101, Yanagigaoka, Tahara Atusumi-gun, Aichi 441-34, Japan.
ZF2TV via AA6KX.
ZF2TT via W6NLG.
ZL7AA via ZL2AL.
4N4VO, 4N4TGG, 4N4CX, 4P4AO, 4N4YS, 4N4EGR, 4N4CFG, 4N4XX and **9A1A** via: Tomislav plak, 9A2AJ, Brace Domay 6/10N, 41000 Zagreb, Republic of Croatia.
4N4KRS, 4N4LJ, 4N4EKK,4N4K, 4N4QSO, 4N4SOS, 4N4EZE, 4N4EAM,
4N4EKC, 4N4ESP, 4N4DNO, 4N4SGG, 4N4OE, 4N4DEJ, 4N4W, 4N4AA,
4N4GJK, 4N4DXZ, 4N4ENO, 4N4SVR, 4N4ESG, 4N4EDK, 4N4CB, 4N4WXX

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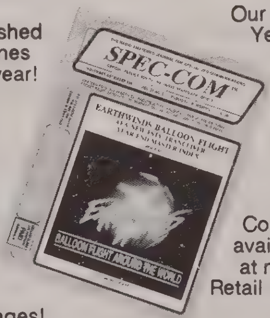

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DX News Around The World

4N4DMO, 4N4HB, 4N4ESM and **4N4EVC** via Mehmed Avdibagovic - DJOQJ, Friedrichrodaer Str. 67b, 1000 Berlin 46, Germany.
5J5J via IK2HTW
9N1/9G1AP via P.O. Box 1114, Katmandu, Nepal.

World News

Harold Beverage

On January 27, 1993, at 99 years of age Mr. Harold Beverage(ex W2BML) became a silent key. Beverage was a well known Ham operator, communications engineer, and inventor. His name is specially famous in the field of communications due to an antenna he invented in 1917.

Space Station MIR newly active

Since the end of January, there's a new crew aboard the Russian space station MIR. The new additions are Commander Gennadij Manakov, U9MIR, and flight engineer, Alex Poleshtshouk, R2MIR. For radio traffic on 145,550 the indicator R2MIR is used. The radio packet station utilizes the same frequency, while the indicator is R2MIR-1.

Ukraine Radio Club Newsletter

The UARL (Ukrainian Amateur Radio League) informs us that ever since the month of January 1992, the *Central Radio Club of Russia* (P.O. Box 88, Moscow) requests additional payment (besides the cost of postage and handling) on all QSL cards sent to Ukrainian Hams. As you can expect there has been turmoil and protest, since no one understands the reason why they're doing this. According to the executive committee of the *Ukrainian Radio Club*, Moscow does whatever possible to obtain money by any means, threatening to block the mailing of such cards. The UARL is asking all Hams around the world not to send QSL cards nor regular mail for that matter, through Moscow. Instead, please use the following address: U A R LQSL-Bureau, P.O. Box 56, Kiev, 25001 Ukraine.

INTERNATIONAL CONTEST

European World Wide Award (EWWA) Update

The EWWA is awarded to all licensed Amateur Radio Stations and SWLs who fulfill the following conditions:

HF

Mixed (CW-Phone-RTTY): 200 confirmed contacts with 200 different countries from official EWWA countries list. Contacts must have taken place as of 1/1/1980.
CW: Same as above in CW mode.
Phone: Same as above in Phone mode.
RTTY: Same as above on RTTY mode.
Monoband: 100 countries on 160, 80, 40 or 30 meters; 200 countries on 20, 17, 15, 12 or 10 meters.
Five Band EWWA: The Five Band EWWA certificate is available for working and confirming 100 EWWA countries on each of the following bands; 80, 40, 20, 15, and 10 meters. It is awarded in Mixed, CW, Phone, and RTTY modes.
Nine Band EWWA: Same as Five Band EWWA but with each of the nine bands; 160, 80, 40, 30, 20, 17, 15, 12, and 10 meters.
Top-List HF: In order to qualify, you must have a total of 292 confirmed EWWA countries as of 1/1/1980 (Mixed, CW, Phone, RTTY). Each Top List Award includes a special pennon.

VHF

100 confirmed VHF contacts made with 100 different countries from the EWWA list of countries as of 1/1/1980. Awarded in FM, SSB, CW, or Mixed modes.

Special OSCAR Award

100 confirmed contacts with 100 different countries from the EWWA countries list via OSCAR satellites as of 1/1/1980.

General Guidelines

QSL cards, or copy, and a log extract containing the callsign of the station worked, country, mode, frequency or band; date and time should be sent to the Award Manager (F6FQK) or your regional checkpoint (see list below) with the appropriate fee to cover costs: 7ECU ($10 US) payable to USD, French Francs, German Marks, Italian Lire, Spanish Pesetas or Sterling Pounds, plus sufficient funds or IRCs to return the QSL cards.

All QSOs must be made with licensed amateur stations working in authorized amateur bands. All stations worked must be land-based stations. All contacts worked must have been initiated from the same country as appears in the EWWA countries list. Amateur radio operators operating in another country must send a copy of their individual licenses and official permission from the authorities for the portable operation, with mention of callsign used in such operation. These copies must be sent to the Award Manager, F6FQK.

The EWWA Board of Directors requests your comments and suggestions for improving the EWWA. For all correspondence, including petition for new country status, write to: Conseil de L'Europe, Regie Des Moyens Audio-Visuels, Francis Kremer, F6FQK, BP 431 R6, 67006 Strasbourg Cedex, France.

Checkpoints List

U.S.A. and Canada: Terrance Lowde, VE2PJ, 910 Argyle, Sherbrooke, Quebec J1J 3J4, Canada.
Central America and U.S.A.: Natan Sterental, OA4OS, P.O. Box 16-1196 Miami, Florida 33116-1196
Cuba: Dr. Juan E. Gonzalez Balado, P.O. Box 5378, Camaguey 70300, Cuba.
South America: Jose Maria de la Vega, LU7HJM, P.O. Box 1401-5000, Cordoba, Argentina; Augusto Morales Zevallos, Aurelio Fernandez Concha 590, Miraflores, Lima 18, Peru.
Caribbean: Richer Leonce, FM5DN, 4Km500 Rte de Balata 97234, Fort de France, Martinique.
Australia, Oceania and Asia: Sidik Tandjung, YB2FRR, Jalan Bromo 32-A Semarang 50232, Central Java, Indonesia; Japan: Tamotsu Ebina, JA1QKK, 1461-206 Nagae Hayama, Miura-Gun Kanagawa 240-01, Japan.
Africa: Afif Benlagha, 7X2RO, 11 Rue d'Alembert 16000, Alger, Algeria; Jean Louis Pipien, 6W6JX, Salins du Sine Saloum BP 200, Kaolack, Senegal.
Europe: Francis Kremer, F6FQK, 31 Rue Louis Pasteur, 67490 Dettwiller, France. Germany: Hans Scharfen, DL3MBE, Oytalstrasse 22 D-8900 Augsbourg, Germany. Italy: Mario Ambrosi, I2MQP, Via A. Stradella 13, 20124 Milan, Italy. Switzerland: Gerard Egger, HB9SNR, Villarsel Le Gibloux, 1743 Estavayer Le Gibloux, Switzerland. Scanvinavian countries: Hanne Nielsen, OZ1CID, Hvidovrevej 468 1 t.v., 2650 Hvidovre, Denmark.
East Europe: Peter Zudor, HA5WE, Paulay E. u. 13 I. em. 1, 1061 Budapest, Hungary. Czechoslovakia: Jiri Pecek, OK2QX, Riedlova 12, 75002 Prerov, Czechoslovakia. C.I.S: Yuri Novikov, UA4CX, P.O. Box 374, 410026 Saratov, Russia. Baltic Countries: Morkunas Vilmantas, LY3BY, P.O. Box 34, 5410 Siauliai 10, Lithuania.

Award Recipients

List of radio amateurs who have received the European World Wide Award (Courtesy of Francis, F6FQK President of the Board and Award manager).

200 SSB: F6FNU, UA4CX, PA0ZH, HB9ARE, 5T5NU, OA4QV, HP6AYV, OA4OS, YB2FRR, TR8SA, 5U7NU, DJ2PU, HB9MP, LU7HJM, FR4FA, 3B9FR, I8IYW, CP5NU, OA4ED.
200 CW: OK2QX, TL8RM, DL1LZ, DJ2MN, IK2FSS.
200 MIX: HA8UB, HB9CRV, F1NVR.
Satellite: DG2SBW, HB9SNR
Five Band SSB: PA0ZH
200 SSB SWL: DL-SWL-REINER

INTERNATIONAL CONTEST

Participating Countries

A2...................Botswana
A3......................Tonga
A4.......................Oman
A5....................Bhutan
A6........United Arab Emirates
A7......................Qatar
A9....................Bahrain
AP...................Pakistan
BV.....................Taiwan
BY......................China
C2......................Nauru
C3....................Andorra
C5....................Gambia
C6....................Bahamas
C9.................Mozambique
CE......................Chile
CE0................Easter Is.
CE0............Juan Fernandez
CM.......................Cuba
CN....................Morocco
CP....................Bolivia
CT...................Portugal
CT3...............Madeira Is.
CU.................Azores Is.
CX....................Uruguay
D2.....................Angola
D4................Cape Verde
D6....................Comoros
DA-DL, DM, Y2-9........Germany
DU...............Phillippines
EA......................Spain
EA8................Canary Is.
EA9.........Ceuta and Melilla
EI.....................Ireland
EL....................Liberia
EP........................Iran
ET....................Ethiopia
F-TK...................France
FG-FM........................
FS............French Antilles
FH.....................Mayotte
FK..............New Caledonia
FO...........French Polynesia
FO..............Marquises Is.
FO..............Australes Is.
FP......St Pierre and Miquelon
FR................Reunion Is.
FR...........Juan de Nova Is.
FR...................Europa Is.
FR...............Tromelin Is.
FT5W...............Crozet Is.
FT5X............Kerguelen Is.
FT5Z............Amsterdam Is.
FW.........Wallis & Futuna Is.
FY..............French Guiana
G-GD-GJ-GU............England
GI...........Northern Ireland
GM...................Scotland
GW......................Wales
H4................Solomon Is.
HA....................Hungary
HB................Switzerland
HB0.............Liechtenstein
HC....................Ecuador
HC8.............Galapagos Is.
HH......................Haiti
HI.........Dominican Republic
HK....................Colombia
HK0................Malpelo Is.
HK0.....San Andres/Providencia
HL............... South Korea
HM-P5.............North Korea
HP.....................Panama
HR...................Honduras
HS...................Thailand

HV....................Vatican
HZ...............Saudi Arabia
I-IS....................Italy
J2...................Djibouti
J3....................Grenada
J5.............Guinea-Bissau
J6..................St. Lucia
J7...................Dominica
J8.......St Vincent/Grenadines
JA.....................Japan
JD...........Minami Torishima
JT...................Mongolia
JW...................Svalbard
JX.................Jan Mayen
JY.....................Jordan
K-N-W-A................U.S.A.
KC6.......Western Caroline Is.
KH1........Baker & Howland Is.
KH2......................Guam
KH3..............Johnston Is.
KH5.......Palmyra & Jarvis Is.
KH6..............Hawaiian Is.
KH8............American Samoa
KH9..................Wake Is.
KH0...............Mariana Is.
KL7....................Alaska
KP1...............Navassa Is.
KP4...............Puerto Rico
LA.....................Norway
LU..................Argentina
LX.................Luxembourg
LZ...................Bulgaria
OA.......................Peru
OD....................Lebanon
OE.....................Austria
OH....................Finland
OK.............Czechoslovakia
ON....................Belgium
OX..................Greenland
OY..................Faroe Is.
OZ....................Denmark
P2...........Papua New Guinea
P4......................Aruba
PA................Netherlands
PJ........Netherlands Antilles
PJ...St Marteen/Saba/Eustasius
PY.....................Brazil
PY0....Trindade/Martin Vaz Is.
PZ...................Suriname
S2.................Bangladesh
S5...................Slovenia
S7.................Seychelles
S9.........Sao Tome & Principe
SM.....................Sweden
SP.....................Poland
ST......................Sudan
SU......................Egypt
SV.....................Greece
T2.....................Tuvalu
T30.............West Kiribati
T31..........Central Kiribati
T32.............East Kiribati
T33................Banaba Is.
T5....................Somalia
T7.................San Marino
TA.....................Turkey
TF....................Iceland
TG..................Guatemala
TI.................Costa Rica
TI9.................Cocos Is.
TJ...................Cameroon
TL........Central Africa Rep.
TN......................Congo
TP..........Council of Europe
TR......................Gabon

TT......................Tchad
TU................Ivory Coast
TY......................Benin
TZ.......................Mali
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..............European Russia
UA, UN, UW, UZ, 1P,
.............Franz Josef Land
UA-UZ-2...........Kaliningrad
UA, UN, UV, UW, UZ, 9, 0,
...............Asiatic Russia
UB, UT, UY............Ukraine
UC................Byelorussia
UD.................Azerbaijan
UF....................Georgia
UG....................Armenia
UH...............Turkmenistan
UI.................Uzbekistan
UJ...............Tadzhikistan
UL.................Kazakhstan
UM.................Kirghizia
UO...................Moldavia
UP-LY...............Lithuania
UQ-YL..................Latvia
UR-ES.................Estonia
V2..........Antigua & Barbuda
V3......................Belize
V4..........St. Kitts & Nevis
V5....................Namibia
V8.....................Brunei
VE.....................Canada
VK..................Australia
VK9L...............Lord Howe
VK9Z..................Willis Is.
VK9X.......Christmas/Cocos Is.
VK9N.............Norfolk Is.
VK0.............Macquarie Is.
VK0.................Heard Is.
VP2V, E, M,
..British Virgin Is., Anguilla
...............and Montserrat
VP5.........Turks & Caicos Is.
VP8..............Falkland Is.
VP8-LU/Z.....South Georgia Is.
VP8-LU/Z......South Orkney Is.
VP8-LU/Z....South Sandwich Is.
VP8-LU/Z-CE9-HF0,
4K.........South Shetland Is.
VP9..................Bermuda
VQ9................Chagos Is.
VR6..............Pitcairn Is.
VS6.................Hong Kong
VU......................India
VU7.....Andamann & Nicobar Is.
V63................Micronesia
V73..............Marshall Is.
XE.....................Mexico
XF.............Revilla Gigedo
XT...............Burkina Faso
XU.................Kampuchea
XW.......................Laos
XX9.....................Macao
XZ......................Burma
YA................Afghanistan
YB..................Indonesia
YI.......................Iraq
YJ....................Vanuatu
YK.......................Syria
YN..................Nicaragua
YO...................Romania
YS................El Salvador
YU.................Yugoslavia
(until Nov. 15, 1992)
YV..................Venezuela
YV0..................Aves Is.

Z2...................Zimbabwe
ZA.....................Albania
ZB..................Gibraltar
ZD7................St. Helena
ZD8.............Ascencion Is.
ZD9...Tristan da Cunha & Cough
ZF.................Cayman Is.
ZK1............South Cook Is.
ZK1............North Cook Is.
ZK2.......................Niue
ZK3....................Tokelau
ZL................New Zealand
ZL7...............Chatham Is.
ZL8.................Kermadec
ZL9....Auckland & Campbell Is.
ZP...................Paraguay
ZS1-6............South Africa
ZS8...Prince Edward Marion Is.
ZS9................Walvis Bay
3A.....................Monaco
3B6-7....Agalega & St. Brandon
3B8.................Mauritius
3B9.............Rodriguez Is.
3C..........Equatorial Guinea
3C0................Pagalu Is.
3D2.......................Fiji
3D2................Rotuma Is.
3DA0................Swaziland
3V....................Tunisia
3X.............Rep. of Guinea
3W....................Vietnam
4S..................Sri Lanka
4U1UN..........U.N.—New York
4U1ITU...............ITU—Geneva
4U1VIC......Vienna Int. Center
4W-7O...................Yemen
4W-7O.............Socotra Is.
4X.....................Israel
5A......................Libya
5B.....................Cyprus
5H...................Tanzania
5N....................Nigeria
5R.................Madagascar
5T.................Mauritania
5U......................Niger
5V.......................Togo
5W.............Western Samoa
5X.....................Uganda
5Z......................Kenya
6W....................Senegal
6Y....................Jamaica
7P....................Lesotho
7Q.....................Malawi
7X....................Algeria
8P...................Barbados
8Q................Maldive Is.
8R.....................Guyana
9A....................Croatia
9G......................Ghana
9H......................Malta
9J.....................Zambia
9K.....................Kuwait
9L...............Sierra Leone
9M2.............West Malaysia
9M6.............East Malaysia
9N......................Nepal
9Q......................Zaire
9U....................Burundi
9V..................Singapore
9X.....................Rwanda
9Y..........Trinidad & Tobago
KC4,8J,CE9,FT8Y,ZS,OR4,4K,G,ZL
VK0,LU,DP0,3Y.......Antarctica

This information is courtesy of Natan Sterental, OA4OS.

NEW

DSP From JPS

NEW

The NRF-7

The new NRF-7 is a medium priced DSP product which provides great flexibility in audio processing. Modes available include atmospheric (white) noise reduction through adaptive peaking; spectral multi-tone notch filtering; notch & peak combined; wide (2400 Hz) and narrow (1800 Hz) SSB filters, with and without spectral notch; wide (500 Hz) and narrow (250 Hz) CW filters with selectable center frequency; and a 500 Hz wide DATA filter centered at 2200 Hz. Since these filters all operate in real time, they can be used for Break-in CW or AMTOR. Note: noise reduction by adaptive filtering reduces noise by dynamically reducing the bandwidth and is not effective against impulse-type noise. **Only the NIR-10 uses spectral subtraction to eliminate impulse noises as well as atmospheric noise, while retaining the full audio bandwidth.**

See Me At
Booths 646 and 647
DAYTON

Only: $249.95

The NIR-10, the standard in DSP Noise Reduction, still only $349.95.
For eliminating carriers & other tones, the NF-60, still only $149.95.

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P.O. Box 97757 Raleigh, NC 27624

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Technical Info 1-919-790-1048 **FAX** 1-919-790-1456

CIRCLE 39 ON READER SERVICE CARD

Advertisers' Index

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Alinco	Cover III	29	310-618-8616
ATVQ	50	None	708-298-2269
Dayton HamVention	3	None	513-454-1456
Digital Communications	12	37	604-820-1162
DX Map	42	None	305-594-7734
Gap Antennas	30	None	407-778-3728
ICOM	34,35	64	800-999-9877
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Kenwood USA	Cover IV	14	310-639-4200
Media Mentors	45, 62	8, 9	718-983-1416
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PC Electronics	8	20	818-447-4565
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SpecCom	62	None	319-557-8791
Standard	Cover II	36	312-763-0081
Synthetic Textiles	48	6	805-658-7903
Universal Radio	30	None	614-866-4267
W5YI Group	10	None	800-669-9594

ViewPort VGA
Color SSTV for IBM / Clones

Features: Receives 8, 12, 24 and 36 B/W, 36 or 72 and M1, M2, S1, S2 FULL COLOR in REAL TIME, the pictures appear on the screen as received. Transmits 8, 12, 24, and 36 B/W and 36 or 72 COLOR. The software is shareware and was created by John Montalbano, KA2PYJ.

Complete Kit Only . . . . $ 169.95
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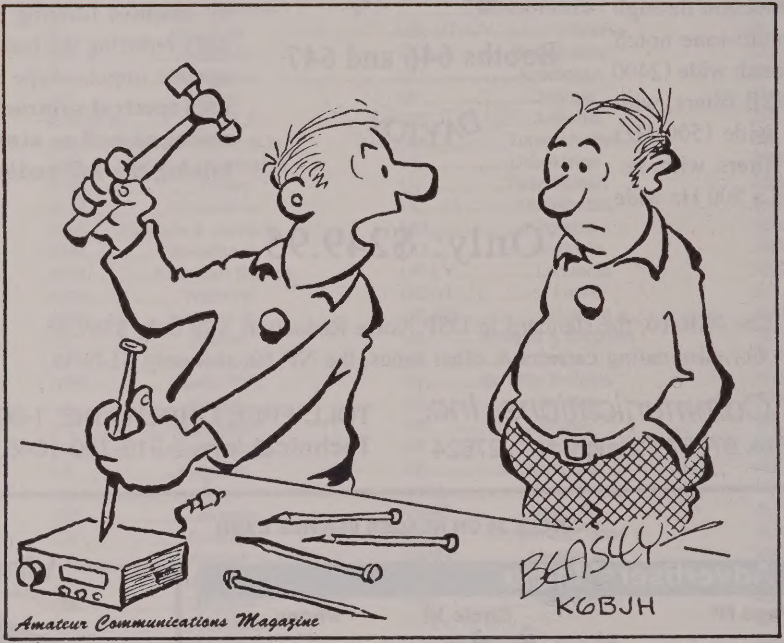
Classifieds

Personal Code Explorer: New! Exciting! Easy to use Personal Code Explorer copies digital radio signals —FAX, Morse, RTTY, ASCII, SITOR, Packet and more on your IBM/PC screen. Free brochure. Call, write. MC/VISA. $129 plus $4 shipping, Microcraft, Box 513RS, Thiensville, WI 53092. Phone (414) 241-8144.

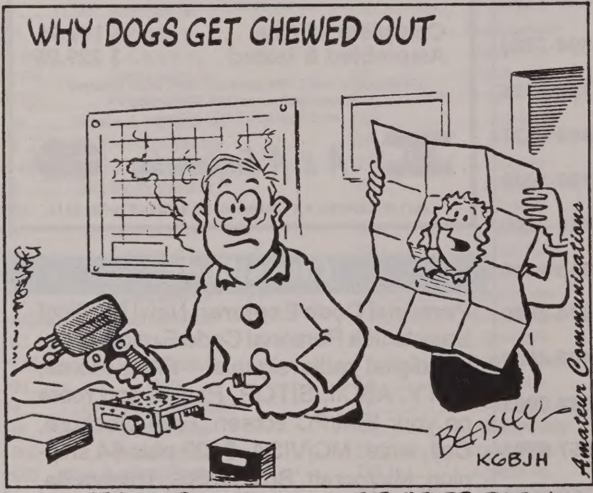
Want: 2M TXRX with removable front panel for remote mobile operation. Please contact Corky Kirk, W6ORS, 270 Kapualani St., Hilo, HI 96720, (808)959-3888.

RadioMania

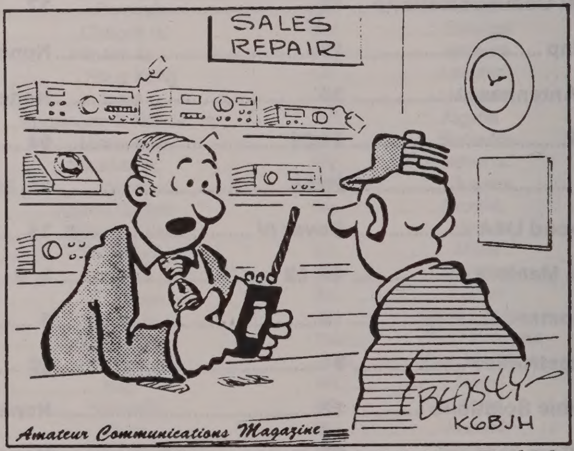
Are you having radio trouble...?



I'VE TRIED EVERYTHING I CAN THINK OF TO MAKE THIS RADIO WORK--- I THOUGHT I'D GO FOR ACUPUNCTURE!



YOU LEFT YOUR SCHEMATIC IN THE OTHER ROOM--- CAN YOU WORK AROUND THE HOLE BUSTER CHEWED IN IT?



YOUR HANDHELD APPEARS TO BE O.K. BUT IT LOOKS LIKE SOMEONE STOLE YOUR RUBBER DUCK AND SUBSTITUTED A LICORICE TWIST!

Simple Operation
Advanced Technology

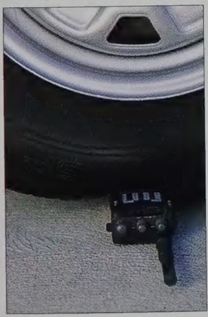
Within Budget - Without Compromise

Just when you thought great audio and tough as nails construction were luxury features available only on the most expensive models, and just when you thought simple, intuitive operation was a thing of the past, along comes the Alinco VHF-FM HT, DJ -180T.

A different offset can be stored in each memory channel, and most other functions can also be stored independently in each memory channel. CTCSS encode and decode comes standard. As most QSO's on 2- meter are done through repeaters, these special features make the DJ-180T the most practical HT to own. Alinco has once again combined high-technology with low-cost.

Check out the affordable technology of the 90's. Check out ALINCO.

Also Available
DJ-580T Dual Bander



Incredibly Tough !

Photo for Demonstration only- Abuse to the transceiver will void the warranty.

- Receive 130.0- 173.9 MHz
- CTCSS encode/decode built-in
- 2 watts standard, 5 watts with optional EBP- 28N battery pack
- High/Low power selection
- Selectable frequency step for quick QSY
- Standard DTMF keyboard
- Low battery indicator
- "Busy" channel LCD indicator
- Key Lock/ PTT Lock functions
- Auto Power Off
- Instant QSY to Call channel
- Monitor button
- Scan Modes
- Battery Saver design
- Supplied with Ni-Cd battery pack EBP-26N for 2 watts output, wall charger, belthook, and strap.
- Optional accessories: EBP'28N Battery pack for 5 watts output, EDH-11 Drycell case, EDC-45 Quick charger, EMS-9 Speaker-microphone, EME-12/13 Headset with VOX/PTT. EME-15 Tie-pin microphone, EDH-12 DC Jack adaptor .EBC-6 Mobile bracket, ESC-18/19 Soft case, EJ-14U 50ch Memory unit, EJ-15U 200ch Memory unit.

ALINCO
ALINCO ELECTRONICS INC.

ALINCO ELECTRONICS INC.
438 Amapola Avenue, Unit 130, Torrance, CA 90501
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CIRCLE 29 ON READER SERVICE CARD

KENWOOD
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NEW
3-Way Split
Mobile transceivers with stylish sophistication

Kenwood's new TM-742A (144MHz/440MHz) and TM-942A (144MHz/440MHz/1200MHz) FM multibanders offer prime performance plus unparalleled freedom of choice for installation (optional kit).

- **High power**
  Maximum RF output is 50 watts (144MHz), 35 watts (440MHz), and 10 watts (1200MHz).
- **Wideband receiver coverage**
  The TM-742A receives from 118 to 174MHz and 410 to 470MHz; transmit ranges are 144–148MHz and 438–450MHz. The TM-942A adds the 1240–1300MHz range.
- **New & improved detachable front panel**
  The display and control sections can be separated for 3-way convenience. (with DFK-3,4,7)
- **100 memory channels**
  The 100 multi-function memory channels (all available for split operation) can be grouped into 5 banks for added convenience.
- **Multiple scan modes**
  Choose from 8 scan modes per band, plus CO (carrier-operated) and TO (time-operated) scan stops.
- **Tri-band receive/display**
  The TM-942A can receive/display all three bands (144MHz/440MHz/1200MHz) simultaneously. For the TM-742A there are four optional band units: 28MHz (50 watts), 50MHz (50 watts), 220MHz (25 watts), and 1200MHz (10 watts).
- **Cross-band repeater, dual-in repeater, fixed-band repeater**
- **Single-bander simplicity**
  Independent SQL and VOL controls for each band enable rapid response.
- **S meter squelch and auto squelch**
  Weak signals can be shut out. Noise squelch is also available.
- **Supplied multi-function microphone**
  Enables direct frequency entry.
- **Clock and timer**
  Includes stopwatch, alarm and on/off timer functions.
- **Wireless remote control function**
  A DTMF transceiver can be used to control various settings on the TM-742A/942A.
- **Built-in DTSS and pager function**
  The TM-742A/942A offers DTSS (Dual-Tone Squelch System) for selective calling and paging using standard DTMF tones. Elapsed time is shown by the tone alert system.
- **Supplied accessories**
  Mounting bracket, DC cable, fuses, mic, mic hook.
- **Choice of accessories**
  A full line of mics, speakers, and other accessories is available. See your authorized Kenwood Amateur Radio dealer for details!

Specifications guaranteed for Amateur band use only.

TM-742A/942A

Mobile Transceivers

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